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THE VETERINARY JOURNAL.

EDITED BY

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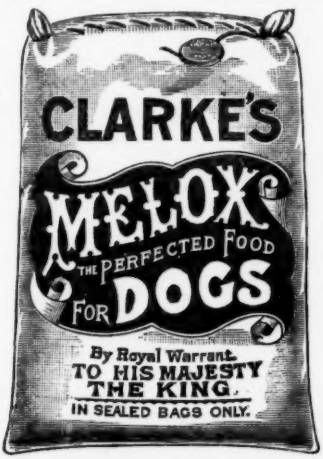

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THE

VETERINARY JOURNAL

MARCH 1904.

Editorials.

VETERINARY INSPECTORS.

THE constant attempts of official personages to ignore the claims of veterinary surgeons must be our excuse for again discussing this thorny matter. The frantic desire to appear careful of the public funds is often exhibited in this, to us, detestable form, and we must protest against this conduct as being not only hypocritical but unjust. Thousands of pounds are squandered annually by municipalities in silly show, in the erection of pretentious buildings, in unnecessary changes, falsely called improvements, and even in parliamentary squabbles over trifling affairs. When it comes to the payment of a definite fee to a medical or veterinary officer the municipal courage fails. The greed of the ordinary councillor is awakened or his pride becomes alarmed: why should a mere doctor get so much when he—the sapient councillor—makes only, shall we say, ten times the amount by "careful attention to business," which often means astuteness and cunning? So the honest and simple-minded medical or veterinary officer, ignorant of jobbery and chicanery, finds himself compelled to accept dog's wages. The medical officer of health, perhaps, finds himself saddled with a responsibility for which he has as little taste as he has aptitude; he has dairies and slaughter-houses to supervise, which would be better supervised by a veterinary surgeon. Or this dairy and slaughter-house work is delegated to some ignorant fellow who has no knowledge of anything except his own needs, and in such a case the public is doubly unfortunate—the so-called inspector is not only a blank as to the duties of his office, he is frequently full of conceit as to his own importance; he does not trust even to the limited natural intelligence which he possesses, but proceeds to swagger and strut as an authority on diseases of animals on the strength of some ill-digested phrases which he has culled from a book on medicine. So often, unfortunately, does it happen that the men appointed to these posts are political sycophants—mere parasites who are by turns servile and insolent, obsequious, and threatening. We sincerely wish that the Government would take the matter of the food supply of the country under its special care, so far at least as inspection is concerned. The matter is, when

properly considered, far more important than the Excise, as to which the most elaborate precautions are taken. Excise officers are appointed and paid by Government, and usually do their work honestly, uninfluenced by fear or favour; to prevent or minimise such possibilities they are, like the soldiery, transferred at intervals from place to place. Why cannot the Government of the country take meat inspection under its own care? It is true there is no apparent income to justify the increase which would take place in the Civil Service estimates, but would there be no real gain? We think the health of the people is a very important asset in the national balance-sheet. We further think that the welfare and judicious management of our flocks and herds are matters of national importance—of an importance which is increasing day by day in proportion as Great Britain becomes gradually less a grain-producing country and more a grazing and milk-producing country. We ardently wish that all our readers would study an article in the *Monthly Review* for February, written by a Danish gentleman, Mr. Westenholz, on this and kindred subjects.

Failing this consummation, so devoutly to be wished, or, in the meantime, whilst such a scheme is being concocted, could not the Government arrange for our being represented on the Local Government Board? This would obviate many difficulties, and at once strengthen the Government and the veterinary profession. We are quite sure that much unfortunate legislation is the result of simple ignorance, and that the Government, with the best and purest intentions, is often led sadly astray by want of professional information. We therefore boldly, and yet with all modesty and deference, suggest this change in the national administration. The time seems ripe for such a movement on the part of the authorities. In a recent number of the *Scotsman* we noticed the following paragraph, which shows how the wind is beginning to blow:—

"EDINBURGH BUTCHERS AND THE PUBLIC HEALTH ACT.—A deputation from the Edinburgh Master Butchers' Association waited upon Edinburgh Town-Council Public Health Committee yesterday with regard to two grievances in connection with the administration of the Public Health Act. The points which the deputation laid before the Committee with regard to meat inspection were (1) that the inspection of meat should be carried out by properly qualified men, of whom there are several in the Public Health Department; and (2) with regard to the disposal of condemned meat, they pointed out that it could be destroyed, not as at present by repeated boilings, which, besides causing a great nuisance, involves considerable expense, but by the use of chemicals, which would ensure that the destroyed meat would only be used for manuring purposes. The Committee thanked the members of the deputation for their expression of views, and stated that they would be considered."

But failing all response on the part of the Government, we would suggest that the Royal College appoint some one to attend in the lobby of the House of Commons to examine all Bills affecting the profession and to interview Members.

THE "VETERINARY NEWS."

WE feel a sort of paternal pride in drawing the attention of our readers to our bantling, which is quite the youngest of the Veterinary periodicals, and has its home, like ourselves, in Messrs. Baillière, Tindall & Cox's office in Henrietta Street. We are not in the least jealous of the youngster, as it does not lessen our literary dignity, but rather increases it by its deferential allusions to our editorial and other articles. We fully recognise that there is a place for a sprightly young paper like the *News*, which gives a weekly summary of veterinary intelligence gleaned from home and foreign fields, and that the occupation of this ground does not by any means narrow our own territory. There are celestial bodies and bodies terrestrial, and the glories are different. Our youngest paper shows a healthy activity and a fine independent spirit. It asks for no indulgence, and does not wish to be pampered. Its modest demand is one penny per week, and for the small sum of three shillings, if added to our own dignified price of a shilling per month, Messrs. Baillière, Tindall & Cox will send both journals to a subscriber for one year to any part of the civilised world. We hope that readers of the VETERINARY JOURNAL will see it to be to their advantage to combine the two subscriptions in order to economise. One never can tell when one may want an assistant; it is even possible that one may want to sell or buy a practice at short notice; it is always good to have the most recent information on one's desk. A friend may drop in and ask for advice; an assistant may be disabled by accident, or he may kick up his heels unexpectedly; we may be at the end of our scientific resources, and unable to diagnose a difficult case: here is the *News*, with a chance account of the very same kind of case treated by a French or German surgeon, and anon comes the JOURNAL with fuller information. Of course some readers may prefer the one paper and some the other. Our advice, tendered with all deference and humility, but based upon an extensive knowledge of the world, is *Fiat mistura amborum.*

Original Papers.

SOME EFFECTS OF SEWAGE ON ANIMALS.[1]

BY MR. TOM BOWETT, SCARCLIFFE, CHESTERFIELD.

MR. CHAIRMAN and Gentlemen—Sewage, considered from the standpoint of its effects on farm stock, is a most interesting subject, although as yet I believe its precise action is imperfectly understood by the members of the veterinary profession.

[1] Read before the Royal Veterinary College, London, Veterinary Medical Society, Session 1903. First Prize Essay for Session.

This, however, is a state of things which arises from several causes; but, in a short communication of this kind, it is unnecessary for me to enumerate more than those which are most patent. First, then, there is only very little literature either in our periodicals or text-books which gives us an insight into this subject; and, secondly, the effects produced are not credited to the proper factors for their production; consequently, in the hope of obtaining information, and further, with a desire to stimulate healthy investigation into a subject of great importance to us, I hereunder offer the following pages to you for your consideration, although I claim to have no exceptional experience of the subject.

Sewage, practically speaking, is liquid with organic matter and putrefactive organisms in suspension, and in towns of greater or lesser importance it is important for the health of the community that it should be removed to some distant spot, so that, by artificial or natural means, it may become purified.

The exact constituents of sewage is a matter of little importance to us at this period of our paper; but we may always safely surmise the constant presence of dead (probably putrefying animal matter), and a more or less numerous collection of putrefactive organisms, not to mention an occasional invasion of pathogenic bacteria; consequently it becomes obvious that, should a quantity of this concoction find its way into the alimentary tract of any animal, it must in some way or other materially interfere with the health of the receiver.

Probably, after a little reflection, I think it will be to our advantage if we consider sewage a little more minutely at the present moment, and it will therefore be necessary to consult the recorded researches of our eminent bacteriologists, so that we may become more intimately acquainted with some of the little "actors" who play a very important part in the substance we now have under consideration.

We are informed that when organic matter dies putrefactive organisms are at work, and it is to these little scavengers that we owe more than many of us think; yet, were it not for their presence, as the great "Pasteur" asserted, we should ourselves be unable to exist. Pasteur said that "whenever and wherever there is decomposition of organic matter, whether it be the case of a herb or an oak, of a worm or a whale, the work is exclusively done by infinitely small organisms. They are the important—almost the only—agents of universal hygiene; they clear away, more quickly than the dogs of Constantinople or the wild beasts of the desert, the remains of all that has had life; they protect the living against the dead, and it is due to their presence that we owe our existence at this part of the world's history." This "life's drama" is going on in sewage, and in this process of putrefaction chemical substances are produced which are known by the term "ptomaines," and these ptomaines, when examined analytically, are found to be alkaloid substances which in some cases are of a most poisonous nature.

Of course, personally, I have no special knowledge of these substances, but from knowledge gained by others, and so unselfishly placed at our disposal, I am led to believe that a substance of this character was at work in some cases I have had the opportunity of observing during past vacations.

It is known from experimental research that these "ptomaines," when injected or absorbed through the alimentary canal into the animal system, produce certain definite results, each set of results being dependent upon

the source from which the "ptomaine" was obtained; but the two symptoms most commonly present are fever and diarrhœa, and these last-mentioned conditions I wish most particularly to impress upon you whilst considering the cases which I am about to bring to your notice.

Some time ago I was in conversation with a veterinary surgeon who had seen many cases in cattle of what might be called "Sewage Poisoning," and he informed me of the conditions under which a herd of milch beasts never, for a period of upwards of three years, brought forth a live calf, or even carried one to the full period of pregnancy. No doubt many of the members here will think this a case of "contagious abortion" pure and simple; but there were certain peculiarities connected with this outbreak which called for investigation before making a dogmatic assertion on the point. The notable feature in these cases was that the beast always slipped calf between the fourth and fifth month of pregnancy, and, added to this, the fœtus was putrid, and the act of abortion was always accompanied, for several days prior and subsequent to the act, by fœtid diarrhœa, fever, and cerebro-spinal irritation.

The animal would usually become recumbent, and remain so for several days, the fæces were fœtid, liquid, and dark in colour, and the breath and body exhaled a mawkish but characteristic odour. These symptoms were sometimes abated in several days, but occasionally death supervened. This outbreak owed its origin, in my opinion, either to the presence in the uterine mucous membrane, or between that and the chorion, of the organism which is credited to be the factor in the production of "Contagious abortion," from which organism a toxine or ptomaine was formed, which became generalised in the system by absorption, or otherwise the ptomaine was manufactured in the intestinal canal, and influenced the fœtus through the umbilical circulation, with the result that "Nature" made this act of abortion one of its efforts to rid the system generally of that which was deleterious and injurious to its wellbeing, and I venture to think this supposition has some certifying evidence in the regularity with which fœtid diarrhœa was present, together with the cerebro-spinal symptoms.

However, now that you have had an opportunity of hearing the cases quoted, also the opinion I venture to form on them, I shall now give you the veterinary surgeon's investigations who had them under his care.

Finding that the whole of the farm stock presented an unthrifty appearance, he first investigated the whole of the food supply (that is to say, the food fed to the cattle in the shed). Parasitic and poisonous vegetation he found none,—in fact the whole of the food supply was most wholesome, and fitted for the purpose to which it was consigned.

He then interrogated the farmer himself, when the following information was elicited:—"Some years ago"—about three—there was an overflow from a conduit which ran across the top of my meadows, and since that date I have had nothing but misfortune. My first disaster consisted in the loss of about eighty sheep which I bought and turned out on the far meadow which bore the brunt of the overflow, and they died like flies. I didn't have any one to them, but they were when opened rotten, just like sheep affected with "black-quarter." If we skinned the carcases and left them about, fowls got at them, as also did the dogs, but finding that they all died after eating the flesh we started and burnt them.

Consequently the water supply was examined. An analyst's opinion was sought, and it was found that the stream—a slow one which ran through

the meadows, and to which they drained, contained in its bed all the filthy matter which usually accumulates when sewage is emptied into any slow-flowing watercourse. It was only necessary to walk through the meadows and the source of its flow was soon found,—in fact, in at least seven places a flowing stream of sewage was winding its way to the bank of the stream.

Here we are led to wonder whether distribution really oxidises organic filth, sufficiently so that it becomes innocuous, and it seems to me that this desirable condition is really dependent on two things, which evidently were wanting in this case, that is, dilution and rapidity of movement, so that it can become thoroughly oxidised; nevertheless, it being a matter of great importance that we should put an end to this great and continuous loss, he advised that the water for drinking purposes should be procured from another source, and thus prevent the loss amongst the farmer's stock, if possible. He did so, and from that time a very rapid improvement took place, and when last I heard of this herd live calves were making their regular appearance.

We can now remove, I think, from our minds the idea that contagious abortion was the bugbear of this herd, and also, I believe, we are not far from a correct solution of the mystery when we place the responsibility on the water supply. Further, taking into consideration the fact that daily a more or less numerous collection of organic filth, putrefactive and toxic products, were introduced into the alimentary tract, is it not more marvellous that they were alive, rather than that they should suffer from its effects occasionally. But there still remains to be found a reason as to why the most severe expressions of this condition were to be found in animals which were pregnant, and also the reason of the time selected during the period of pregnancy. It is well-known that, even during health, there are always present in the body organisms which are capable under certain circumstances of producing ptomaines, and it is necessary for the wellbeing of the animal that to keep ahead of the poison it is essential that the excretory organs should perform their functions regularly, or disaster may ensue. The respiratory and intestinal tracts are full of the organisms which are found in the soil, air, food, water; and many of them, when they find imperfect conditions of health in the various organs, settle down in what to them are pleasant surroundings in which to proliferate and increase, which they do with such rapidity that from a few single organisms many millions may make their appearance in twenty-four hours; and it is only by an exertion on the part of nature that the system is ridded of these undesirable invaders, together with products; therefore it may be surmised that at the time of pregnancy there must be some special condition of one or more tissues which is suitable for the lodgment of the organisms which are taken into the intestinal canal; consequently we may further infer that, as in all nature, abortion is under these circumstances her method of righting an overcharged system.

During the past year I had several interesting sewage cases pointed out to me, and some of them were rather strange, yet convincing;—therefore I shall endeavour to record them.

Some dairy cattle were having "mangolds" fed to them as part of their daily ration, but it became necessary that others should be procured to help them out, therefore those which were nearest at hand were purchased, and they happened to grow on a sewage farm. In less than twenty-four hours after first beginning to feed them, nearly every beast was suffering from

gastro-intestinal derangement; in addition, some had cerebro-spinal symptoms; and further, others were temporarily affected with blindness, and one succumbed, on which a post-mortem was made. The appearance of the carcase, after lying nearly twenty-four hours, was most interesting; it was in a state of rapid decomposition and greatly tympanitic. This, however, might have been due to the presence in the mangolds of the gas-forming bacillus, which is present in those that are grown on soil containing much organic matter.

The internal organs were all stained with blood-colouring matter, and were soft and flabby; in fact, we might have concluded, especially as the blood was liquid and dark in colour, that it was a case of septicæmia. The spleen, however, let it be noted, was in no way indicative of anthrax.

Treatment consisted of salts, oil, and stimulants, with the addition of creosote, and recovery of the remainder took place in accordance with the severity of each one attacked, and without any additional loss. The mangolds, it is unnecessary to say, were at once discontinued.

The cases just referred to may be considered, I think, as purely and simply those of auto-intoxication. The animals were well and healthy until they ate the mangolds, and then symptoms were rapidly developed which are often seen in human beings under certain conditions. The human cerebro-spinal system is often affected when from some cause micro-organisms find their way into the intestinal canal, and especially when there is a slight torpidity of the bowels, in which case the food rapidly decomposes, and the toxic products produced are absorbed. There certainly seems a great similarity between the cases, and the more so when we consider that in the human subject diarrhœa is also present.

Occasionally in veterinary practice very peculiar conditions are seen attendant on "colic cases," by which term I include all conditions of abdominal pain, but in several cases which recently came under my notice on a sewage farm I am led to think that their peculiar features depended upon the presence in the stomach and intestines of sewage products.

No doubt some of you will remember cases which have occurred in country practice, in which one has a colic case that at the commencement shows no particularly acute pain, but the animal continues to paw the ground, the pulse is considerably increased, and to one's surprise, when the temperature is taken, the latter is found to register 104° or 105° F. The abdominal murmurs are present but subdued, and although the fæces are not passed, excepting in small quantities, the urine may be voided rather frequently.

This state of things continues for a time, then tympany makes its appearance. One may alleviate this, but the animal may show symptoms of cerebro-spinal meningitis, or die off quietly, much to the surprise of everybody connected with it. A post-mortem is made, but still the state of mind is not relieved.

Unfortunately these cases occurred on the same farm, and although on two occasions timely attention has been rewarded with a successful issue, I am afraid that I am unable to advance you any line of treatment which we might consider in the light of a specific.

Here, in the cases above referred to, we have more than one condition to fight; not only have we the products of the sewage matter, but, on account of the stagnation in the bowels, we have the poisons which are generated from the food contained in the intestinal tract and stomach

also, and it is highly probable that were we in a position whereby we could produce a rapid evacuation of the bowels with safety more cases might be pulled through. Physostigma is, in experienced hands, a magnificent drug, but previous to its employment certain preliminaries are necessary for its successful action, and unless these are strictly adhered to I do not hesitate to say that the good reputation the drug deserves and the animal on which it is employed will suffer. Physostigma should never be used unless the animal has had a pint of oil for upwards of two hours, if he has already stopped passing fæces when he comes under your immediate notice.

Dysentery in cattle is, no doubt, in many cases due to the presence in the intestinal canal of organisms which have been taken in with the drinking water, and very often is this condition seen where animals are allowed to drink from a stagnant pond in the farm-yard, where no doubt in many cases the sewage from not only the stables but the farm-house percolates. This disease may sometimes be seen as an endemic, when we may rightly surmise that it is due to some specific collection of organisms which are present in the water or food; but more occasionally only one or two suffer, and especially is this so when young calves get to such a water supply for the first time, if they only take sufficient of it, and stir the bottom up while in the act. Here, by the way, we might mention the necessity of regularly cleaning out all ponds which are of a stagnant or semi-stagnant nature.

Professor Walley, in his "Meat Inspection," says:—"Dysentery is a specific inflammation of the large bowel, most frequently seen in cattle, sheep, and pigs, rarely in the horse, and is produced by the action of organic irritants, by contamination (especially by sewage) of pastures or of water, or by the excreta of diseased animals, by decomposing or fermenting vegetable matter, and by stagnant water." Dysentery is characterised by fever, profuse diarrhœa, and finally the appearance of blood in the discharge, which ultimately becomes almost pure blood. Sometimes it does not run its regular course, which usually terminates in death, but becomes of a chronic character, and the animal becomes what might be described as "a living wreck." On post-mortem examination the bowel is found to be in some cases ulcerated, and the whole of the membrane lining the bowel is in an inflamed condition, and if sewage has been responsible for its production this is almost a characteristic feature; but occasionally this condition is mistaken for cases of muco-enteritis, which, according to some writers, is much more common than dysentery, although neither of the diseases named are seen in veterinary practice to such an extent that it becomes a matter of ease to diagnose, which condition we have to deal with during life.

There is yet one other condition which I wish to mention in connection with this subject, and it is one which I believe has caused a good deal of discussion of late years, or rather the past few years. I refer to what is known under the term "Mycotic Gastro-Enteritis" in the dog.

Friedberger and Frohner in their book, "The Pathology and Therapeutics of the Domesticated Animals," describe the condition as "an intestinal affection accompanied by general disturbances, produced through the invasion of pathogenic micro-organisms and through the absorption of poisonous ptomaines."

I have seen a good many cases of what I believed to be cases of

this condition. Several of these cases were believed to arise through dogs eating garbage, which was deposited in a field close to the town, together with the contents of middens. This, of course, can hardly be said to be sewage, but the addition of water would liquefy it to its required consistency, yet it would not increase the potency for evil therein contained; therefore I think I may venture to proceed.

The condition, then, is one of septic gastro-enteritis, and its peculiar features are vomiting, purgation, and prostration. There is a constant desire for liquid, but, as a rule, only water will be taken; if purgation continues, blood makes its appearance in the evacuations; later the body temperature is lowered, prostration and emaciation are extreme, and death very frequently quickly follows; in fact 90 per eent. of the cases die in spite of all attention being bestowed upon them.

In one case a very unlooked-for incident supervened. After the dog had made what we considered a good recovery—in fact, it was getting about again—when our attention was requested, and a desire expressed that we should carefully examine the tongue. We did so, and to our surprise we found it turning black from the tip, and proceeding all round the edge and for some distance into the tongue; it was cold to the touch, and clammy. The dog was given everything possible in the way of easily digestible diet, was given strychnine, and finally sent round to a doctor's in the town, and the electric battery was applied to the tongue, an operation which I did not see performed, so am unable to explain satisfactorily how it was done,—but all to no purpose; the tongue mortified and the dog died, and the veterinary surgeon I was with attributed this to ptomaines, derived from the originating cause of the first condition, or developed subsequent to the gastric attack.

With regard to treatment, I think we should treat the system, not the intestinal tract alone; therefore, in addition to an oleaginous purgative and a little creosote, we should administer stimulants and quinine or salycine.

This, gentlemen, brings me to the end of my paper, and I trust I have been able to make myself understood, and that the subject has been of interest to you, and that I have not wearied you too much by the extent of the lines.

Thanking you all for your kind attention.

Authors consulted.—Sims Woodhead's "Bacteria and their Products"; Professor Walley's "Meat Inspection"; Friedberger and Frohner's "Pathology."

THE VETERINARY SERVICE OF THE GERMAN ARMY.

THE veterinary surgeons (rossarzte in the Prussian, veterinär in the Bavarian army) are classed as "employees of the military administration (beamten der militar verwaltong)," and form a portion of the administration of the Empire, as defined by the law of March 31, 1873.

In the military administration are two classes of employees—military and civil—but the term functionary seems more definitive, and indeed in Germany the two words are distinguished beamte (functionary), and angestellta (employee). Veterinary surgeons are classed with military

employees, together with the officials of the Judge Advocate's department, paymasters, chaplains, apothecaries, armourers, and saddlers. Employees (beamtenstand) are quite distinct from combatants (soldatenstand); but surgeons are considered as combatants.

Candidates for commissions as veterinary surgeons must be in possession of certain educational certificates, amongst which qualifications a knowledge of Latin is required, and they must not exceed the age of twenty-six.

Application must be made to the inspector of the veterinary service at Berlin, and accepted candidates are sent as probationers to the cavalry, artillery, and military train. They enter into an engagement to serve in the army twice as long as they are in passing through the veterinary school, in addition to that which they are legally compelled to do as conscripts by German law.

After serving for at least six months as private soldiers, and passing an examination in practical shoeing, they are recommended for the course at the military school of farriery at Berlin, which lasts a year. Having passed another examination on this subject, the students are admitted to the veterinary college.

The school of farriery is close to the veterinary college, and the staff consists of a principal veterinary surgeon, five first-class veterinary surgeons, and two veterinary surgeons. The students number 145, who are lodged and boarded in the school. They have the privilege of wearing plain clothes when off duty; but otherwise are looked on as private soldiers. They go through exactly the same course at the veterinary college as civilians do.

Those students who pass through the college successfully and put in the seven sessions are appointed anterrossarzt, *i.e.*, assistants, being classed as combatants and ranking with a quartermaster; they usually have to serve for three or four years before being promoted veterinary surgeon, which goes by seniority, and as vacancies take place.

In reality, however, the veterinary staff is recruited from the schools, qualified practitioners who have performed six months' service as soldiers being appointed assistant veterinary surgeons, and coming on the graduation list for promotion to veterinary surgeon. In the Bavarian army this is the only way of entering this branch of the service.

For purposes of discipline the Veterinary Department of the German army is under a colonel, who has the title of inspector, and the following are the grades:—

1. Corps veterinary surgeons, . .	Corpsrossarzte.
2. 1st class veterinary surgeons, . .	Oberrossarzte.
3. Veterinary surgeons, . . .	Rossarzte.
4. Assistant veterinary surgeons, . .	Unterzossarzte.

With the exception of the assistants, all rank as superior military employees with the status of officer, entitled to be saluted by non-commissioned officers and men, to wear plain clothes off duty, and engage in private practice.

The uniform is a departmental pattern, collar and cuffs, black cloth, crimson braiding shoulder straps and epaulettes, with a special badge, two stars for a corps veterinary surgeon, one for a first class, the helmet ornaments of gilt. In Bavaria the buttons and ornaments are silver.

The strength of the department is as below:—

Prussia.

	Corps V.S.	1st Class V.S.	V.S.	Assist. V.S.
Military veterinary school and school of farriery, Berlin,	1	5	2	—
Five schools of farriery,	—	5	5	—
Cavalry school,	1	—	1	—
Artillery school,	—	1	2	1
Headquarters of army corps,	17	—	—	—
Cavalry, 74 regiments,	—	71	99	79
Artillery, 70 regiments,	—	69	81	5
Military train, 17 battalions,	—	—	17	—
Foot chasseurs at Bitche,	—	—	—	1
Colonies,	—	2	8	—
Remount depôts,	—	23	3	—
	19	176	218	86

Two first-class veterinary surgeons, three veterinary surgeons, and one assistant are on special duty at the Berlin Veterinary College, the Institute of Hygiene and Pathology, and the Imperial Public Health Office.

Bavaria.

	Corps V.S.	1st Class V.S.	V.S.	Assist. V.S
School of farriery,	1	—	1	—
School of equitation,	—	—	1	—
Headquarters of army corps,	3	—	—	—
Cavalry, 10 regiments,	0	10	20	—
Artillery, 12 regiments,	—	11	14	—
Military train, 3 battalions,	—	1	2	—
Remount depôts,	—	3	2	—
	4	25	40	—

Saxony.

	Corps V.S.	1st Class V.S.	V.S.	Assist. V.S.
School of farriery,	—	—	2	1
Headquarters of army corps,	2	—	—	—
Cavalry, 6 regiments,	—	6	8	8
Artillery, 8 regiments,	—	8	10	8
Military train, 2 battalions,	—	—	2	—
Remount depôts,	—	2	1	—
	2	16	23	17

One assistant veterinary surgeon on special duty at the Dresden Veterinary School.

Wurtemberg.

	Corps V.S.	1st Class V.S.	V.S.	Assist V.S,
Headquarters,	1	—	—	—
Cavalry, 4 regiments,	—	5	4	1
Artillery, 4 regiments,	—	4	4	—
Military tram,	—	—	1	1
Remount depôt,	—	1	—	—
	1	10	9	2

Summary.

Prussia,	19	176	218	86
Bavaria,	4	25	40	—
Saxony,	2	16	23	17
Wurtemberg,	1	10	9	2
	26	227	280	105

Corps veterinary surgeons are under the authority of the general commanding the army corps, and, subject to him, are charged with the veterinary section of the army corps; the other veterinary surgeons are under the officer commanding the unit to which they are attached. Pay increases every three years, the maximum being reached just before retirement; in addition, lodging allowance is given.

Pay in Sterling.

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Corps veterinary surgeon, .	£180 to £210 6 8	£165 to £210
1st Class veterinary surgeon,	135 to 165 0 0	120 to 165
Veterinary surgeon, . .	75 to 120 0 0	90 to 110
Assistant veterinary surgeon, ...		£60 : 6 : 3

Lodging allowance is that of lieutenants, together with an extra amount for compensation (Wohnungsgeldzuschuss); both vary in amount in different stations, which are divided into five classes.

Classes of Station.

	I.	II.	III.	IV.	V.
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In comparison with the pay of a veterinary surgeon it may be of interest to note that of other officers, viz., a first captain, £164; second captain, £135; first lieutenant, £75; second lieutenant, £45 to £59 : 6 : 8. Retirement is carried out at 64 years of age, pension being calculated at the rate of $\frac{15}{60}$ of full pay after 10 years' service, and rises by $\frac{1}{60}$ up to $\frac{45}{60}$.

Pensions.

	10 Years.			25 Years.			30 Years.			35 Years.			40 Years.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
1st class vety. surgs.,	42	9	2	84	15	10	98	17	6	113	0	0	130	0	10
Veterinary surgeons,	26	1	8	52	4	2	60	18	4	69	13	4	78	7	6

The same pension as other officers is given to widows and orphans, also for wounds, injuries, and sickness contracted on service, viz., £3 per mensem, on attaining the age of 55 this is raised to £150 per annum.

The service for the Reserve is filled up by veterinary officers who have retired from the active army, but on whose services the Government still have a claim, and by civil practitioners who have put in part of their compulsory service as auxiliary veterinary surgeons. They put in six months of this service as volunteers in the cavalry, artillery, or military train as private soldiers, when they are appointed assistant veterinary surgeons, taking seniority in the department and wearing its uniform. After a year's service they are drafted into the Reserve, during which time they are called up twice for duty, two months each time. They then go with the territorial army, and do two tours of duty of thirteen days each. During their service in the Reserve they are graded as veterinary surgeons. The rank of 1st class veterinary surgeons in the territorial army is only given to professors of the state, veterinary, and agricultural schools and colleges, and, in certain exceptional cases, to government district veterinary surgeons. There are 350 veterinary officers in the Reserve—250 in the first and 100 in the second class of the Landwehr.

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Mr. President and Gentlemen,—My first duty is to thank you for doing me the honour of inviting me to read a paper at your meeting to-day. I am sensible of the compliment paid me, and trust that in bringing before your notice these observations on Pasteurellosis of the horse, I have not promulgated a subject which will prove uninteresting to you.

The Pasteurelloses are a group of diseases affecting not only all the domestic animals, but also the guinea-pig, the rabbit, the goat, the buffalo, wild animals, and birds, whose connecting link lies in the fact that their etiological factor in each case is an organism which possesses identical staining, cultural, and other characteristics. In this grouping are now included diseases, the relationship of which was not even suspected formerly. They are all types of hæmorrhagic septicæmias and in spite of the numerous animal species affected the same processes are established in all, the same essential lesions are always recognised. There is a similarity in the mode of evolution of each disease and the clinical and anatomical manifestations are often superposable, so that the termination of each may often be foretold.

It is to Lignières that we owe so much of our knowledge of this class of diseases and he has particularly worked up the affection in the horse.

The organisms of the group Pasteurella possess the following essential

characteristics: Non-motile cocco-bacilli with clear centres and coloured poles, very polymorphic, non-sporulating, ærobic, do not stain by Gram's method, can be cultivated in meat bouillon on gelatine on gelose, but giving no visible cultivation on potato naturally acid, do not liquefy gelatine nor coagulate milk, not making indol in pancreatic bouillon, not reddening the gelose of Würtz, giving in cultures an odour *sui generis* (Nocard and Leclainche).

The researches of Lignières have brought to light a very important property possessed by many of the Pasteurella organisms, and this constitutes a weighty point in looking at the diversity of the symptoms manifested. He has shown that several of this group of organisms can cause ephemeral affections of so slight a nature that the disease passes unperceived; but although no symptoms are manifested by the Pasteurella infection, yet their toxines reduce to *nil* the natural defences of the organism, so that they permit or rather facilitate a secondary infection by organisms naturally present in the respiratory or alimentary tracts. These secondary infections may be multiple and varied. One can conceive, then, how these secondary infections complicate the study of the microbic invasions and what errors may arise.

The dog, in the disease called distemper, furnishes the best example of the pernicious influence of the Pasteurella organism. Distemper is due to a Pasteurella organism, but many of the clinical types of that disease are due to secondary infections. Lignières regularly, at will, brought on the pneumonic form of distemper by inoculating a dog with a cultivation of the Pasteurella and then exposing him to cold or immersing him in cold water and allowing him to shiver. This pneumonia is not caused by the Pasteurella but by an organism (the cocco-bacillus fœtidus ozenæ of Perez) normally present in the mouth and nasal cavities of the dog and not usually pathogenic.

The microbes, both of the Pasteurella group and the secondary infections, afford an illustration of the transition of organisms from saprophytes to parasites. They seem to be present in the soil and in the forage; then when they gain an entrance into an animal's system they acquire an exalted virulence, consequently we get many more cases infected from the first. After a time the virulence becomes diminished, the last cases of an outbreak are generally mild, and the disease is said to die out.

Pasteurella have been found in those three diseases which are often classed under the one name of influenza, viz., pink-eye, catarrhal fever, and equine contagious pleuro-pneumonia; and Lignières asserts that "all the grave forms possess common characters and an air of parentage which permits of their being united into one group." Up till now they have been considered, as it were, independent units. "They are all general infections from the outset, but after a rapid increase the microbes tend to disappear from the blood and the parenchymata of the organs, in order to vegetate in some certain media only. The Pasteurella are difficult to find by direct examination, even although the evolution has been so rapid. In a number of animals they are no longer met with at the moment of death."

I have referred to secondary infections following upon the depressing action of the Pasteurella infection, and you can quite understand that in consequence of these multiple infections diverse clinical types are presented, which, from their dissimilarity, have been thought to be different diseases and have received different names.

Under the one term influenza we have in this ccuntry included the three diseases—pink-eye, equine contagious pneumonia, and catarrhal fever, though they are generally looked upon as separate entities. There is a good deal of confusion about the term influenza, and attempts have been made to limit its scope. Dieckerhoff and Williams class the above three mentioned diseases under it. The German for pink-eye is pferdestaupe, for contagious pneumonia brustseuche and for catarrhal fever scalma. Friedberger and Fröhner do not recognise scalma as a distinct disease; their influenza is only pink-eye; they look upon pneumonia as a separate disease. The French recognise three forms, viz., typhoid fever (pink-eye), infectious pneumonia, and grippe (catarrh) all under influenza.

For some time past I have looked upon these three diseases as presenting many features in common, and since Lignières' researches were published I have endeavoured to test his conclusions by the light of practice.

I intend to give you some recent examples of the interchangeability of these three forms; but first I give you an example which to my mind goes far towards proving his assertion that they are types of septicæmias, at least the pink-eye form is.

During the month of December 1901 we had in the College Infirmary, amongst other patients, several affected with typical pink-eye. (It will be unnecessary for the purposes of this paper to detail the symptoms of that disease; I take it for granted that you know them). One of the patients not affected with pink-eye was a brown cart gelding which had been fired and blistered for lameness, and had stood at the College in one box for six weeks. He was consequently under constant supervision. His box was quite near to some occupied by the pink-eye patients. During the course of one day (Dec. 11th) he was noticed to be lying down frequently, similar to a mild attack of colic. In the afternoon, noticing he had not eaten his midday feed, I examined him more closely. To my surprise I found his pulse to be 84 and weak, and the temperature 104·8°; the respirations were a little accelerated, and the mucous membrane of the mouth was injected, and of a yellow brown colour. Next morning the pulse was 85 and the temperature 105·9°, and the respirations 14, *i.e.*, not much above normal; the colour of the mucous membrane of the mouth was a deep yellowish-brown. The day following the pulse could not be felt at the jaw, but the heart was beating tumultuously at the rate of 100 per minute, similar to what it does in all septic infections; the respirations were 19, shallow, and sighing; the mucous membrane of the mouth was brown and pasty-looking, that of the conjunctivæ pinkish and injected; there was no appetite, and the mouth exhaled a very fœtid odour. Since the preceding night a large fluctuating swelling the size of a football, but not quite so prominent, had appeared over the right shoulder; there was another swelling the size of a cocoa-nut behind the right elbow and still another one of about similar size on the back; the gluteal muscles were conspicuously flabby.

The animal died at 2 p.m. that day, practically about 48 hours after being noticed to be ill, and the post-mortem was made two hours afterwards. The subcutaneous tissue was in places infiltrated with an amber-coloured gelatinous serosity, particularly in the region of the above-mentioned swellings. The stomach was about half full of a clear watery liquid, containing some bits of masticated hay, but no corn; one ascaris megalocephala was found there; the external coats looked normal but the

Wurtemberg.

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Headquarters,	1	—	—	—
Cavalry, 4 regiments,	—	5	4	1
Artillery, 4 regiments,	—	4	4	—
Military tram,	—	—	1	1
Remount depôt,	—	1	—	—
	1	10	9	2

Summary.

Prussia,	19	176	218	86
Bavaria,	4	25	40	—
Saxony,	2	16	23	17
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The microbes, both of the Pasteurella group and the secondary infections, afford an illustration of the transition of organisms from saprophytes to parasites. They seem to be present in the soil and in the forage; then when they gain an entrance into an animal's system they acquire an exalted virulence, consequently we get many more cases infected from the first. After a time the virulence becomes diminished, the last cases of an outbreak are generally mild, and the disease is said to die out.

Pasteurella have been found in those three diseases which are often classed under the one name of influenza, viz., pink-eye, catarrhal fever, and equine contagious pleuro-pneumonia; and Lignières asserts that "all the grave forms possess common characters and an air of parentage which permits of their being united into one group." Up till now they have been considered, as it were, independent units. "They are all general infections from the outset, but after a rapid increase the microbes tend to disappear from the blood and the parenchymata of the organs, in order to vegetate in some certain media only. The Pasteurella are difficult to find by direct examination, even although the evolution has been so rapid. In a number of animals they are no longer met with at the moment of death."

I have referred to secondary infections following upon the depressing action of the Pasteurella infection, and you can quite understand that in consequence of these multiple infections diverse clinical types are presented, which, from their dissimilarity, have been thought to be different diseases and have received different names.

Under the one term influenza we have in this ccuntry included the three diseases—pink-eye, equine contagious pneumonia, and catarrhal fever, though they are generally looked upon as separate entities. There is a good deal of confusion about the term influenza, and attempts have been made to limit its scope. Dieckerhoff and Williams class the above three mentioned diseases under it. The German for pink-eye is pferdestaupe, for contagious pneumonia brustseuche and for catarrhal fever scalma. Friedberger and Fröhner do not recognise scalma as a distinct disease; their influenza is only pink-eye; they look upon pneumonia as a separate disease. The French recognise three forms, viz., typhoid fever (pink-eye), infectious pneumonia, and grippe (catarrh) all under influenza.

For some time past I have looked upon these three diseases as presenting many features in common, and since Lignières' researches were published I have endeavoured to test his conclusions by the light of practice.

I intend to give you some recent examples of the interchangeability of these three forms; but first I give you an example which to my mind goes far towards proving his assertion that they are types of septicæmias, at least the pink-eye form is.

During the month of December 1901 we had in the College Infirmary, amongst other patients, several affected with typical pink-eye. (It will be unnecessary for the purposes of this paper to detail the symptoms of that disease; I take it for granted that you know them). One of the patients not affected with pink-eye was a brown cart gelding which had been fired and blistered for lameness, and had stood at the College in one box for six weeks. He was consequently under constant supervision. His box was quite near to some occupied by the pink-eye patients. During the course of one day (Dec. 11th) he was noticed to be lying down frequently, similar to a mild attack of colic. In the afternoon, noticing he had not eaten his midday feed, I examined him more closely. To my surprise I found his pulse to be 84 and weak, and the temperature 104·8°; the respirations were a little accelerated, and the mucous membrane of the mouth was injected, and of a yellow brown colour. Next morning the pulse was 85 and the temperature 105·9°, and the respirations 14, *i.e.*, not much above normal; the colour of the mucous membrane of the mouth was a deep yellowish-brown. The day following the pulse could not be felt at the jaw, but the heart was beating tumultuously at the rate of 100 per minute, similar to what it does in all septic infections; the respirations were 19, shallow, and sighing; the mucous membrane of the mouth was brown and pasty-looking, that of the conjunctivæ pinkish and injected; there was no appetite, and the mouth exhaled a very fœtid odour. Since the preceding night a large fluctuating swelling the size of a football, but not quite so prominent, had appeared over the right shoulder; there was another swelling the size of a cocoa-nut behind the right elbow and still another one of about similar size on the back; the gluteal muscles were conspicuously flabby.

The animal died at 2 p.m. that day, practically about 48 hours after being noticed to be ill, and the post-mortem was made two hours afterwards. The subcutaneous tissue was in places infiltrated with an amber-coloured gelatinous serosity, particularly in the region of the above-mentioned swellings. The stomach was about half full of a clear watery liquid, containing some bits of masticated hay, but no corn; one ascaris megalocephala was found there; the external coats looked normal but the

walls were thickened. The cuticular portion was normal, but the villous part was diffusely congested and of a bright strawberry colour, its mucous membrane easily tore off. The small intestines were normal; the cæcum was slightly congested; the first three portions of the colon were normal but the fourth part was inflamed; the lymphatic glands were swollen, soft, and hæmorrhagic. The liver and kidneys were congested; the spleen was normal. At the root of the lungs was a yellow gelatinous exudate extending along the œsophagus and aorta, and around the base of the heart. This gelatinous exudate was firmer than what one finds in anthrax. The lungs were congested with black blood; the trachea, large and small bronchi were all filled with a frothy spume. Subpleural hæmorrhages were present on that part of the lung just posterior to the heart on the left side; these hæmorrhages were chiefly about the size of a pea, but there were some diffuse ones. The heart was enlarged, the ventricles contained no blood, but each a small post-mortem clot; the valves were normal and there were no hæmorrhages on the endocardium. The blood was black, but it coagulated slowly and brightened on exposure to air.

Briefly speaking, the post-mortem appearanees suggested some resemblance to anthrax as it occurs in the horse; but I made sure by microscopic examination of the blood that it was not that disease. The gelatinous exudations and hæmorrhages would indicate a septicæmia, and judging from the prevalence of pink-eye at the time of the onset of the affection, strong evidence is I think adduced that this was a case of hæmorrhagic septicæmia due to infection from the pink-eye patients. I could not trace the method of infection.

I remember one other case which presented very similar symptoms, which came from a stud of 100 horses where contagious pneumonia is endemic, so to speak. He died in two or three days, and on post-mortem examination the lesions were even more suggestive of anthrax. No anthrax bacilli were found on microscopic examination of the blood, though the gelatinous exudate around the lymphatic glands along the attachment of the great colon, together with their hæmorrhagic condition, were almost identical with what is found in anthrax in the horse.

I am comparing the appearances to those of anthrax, because I think that disease is the *beau ideal* of a septicæmia. Within the past few weeks a case has been communicated to me of a horse which died after only four hours' illness, and in which the post-mortem appearances would have served for a description of anthrax; the blood was oozing from the nostrils and anus, &c., yet when I examined the blood no anthrax organisms were found but only a few cocc-bacilli. This case I venture to submit is also a case of hæmorrhagic septicæmia from infection with the Pasteurella organism.

I remember also one other similar case. We cannot be dogmatic from the above few cases, but I think we can go the length of saying that in the horse we meet with a septicæmia causing rapid death, not caused by the anthrax organism, possibly by a Pasteurella. Nocard and Leclainche give the duration of the peracute form as 24 to 36 hours.

Speaking of the interchangeability of the three clinical forms of Pasteurellosis of the horse, as a rule an epidemic assumes one of the three types and sticks to that, nevertheless one occasionally sees a coupling of the one with the other. Besides, one meets with what we may call abortive forms during an outbreak.

I have met with one or two outbreaks in which, whilst one form of the above-mentioned types predominated, one or two patients became affected with one of the other types. Some time ago a horse in a stable containing twenty-two horses became affected with pink-eye. It rapidly spread, and all the animals with the exception of three, had more or less severe attacks of pink-eye. Two of these three remained healthy, but one of them, at the time the others were suffering from pink-eye, instead of following the regular course, had a pretty bad attack of contagious pneumonia.

The contention may be urged that this was only a case of pneumonia complicating or supervening on pink-eye, but this case showed no eye symptoms, and the pneumonia was marked from the outset.

In another outbreak in a stud of twelve horses, last year a mare (Kitty) took contagious pneumonia (in which, however, pleurisy was the predominating lesion). She was removed to the College Infirmary to prevent the other horses catching it, and she remained there three weeks. Convalescence was slow, and when she returned home she had still her chest half full of water. She was placed in her old stall, near to which was a grey gelding. On the seventh day after, the grey was noticed to be off his feed and on examination was found to have pneumonia. Four more horses became affected with typical contagious pneumonia, one other horse became feverish and off his food, he did not develop pneumonia, but he suffered from exudative iritis and photophobia of both eyes. The pupils became obscured by a deposit of fibrinous lymph which after a time dropped down into the bottom of the anterior chamber. It then assumed a greenish-yellow colour and gradually disappeared. This resembled the condition known as periodic ophthalmia very much, and as if to lend colour to that statement the horse is reported to me as being now blind in one eye. Anyhow, it is rather curious that if so his first attack should come on whilst contagious pneumonia was prevalent in the stable.

In a third outbreak pink-eye broke out eight days after the introduction of a new horse. This new horse seemed healthy when purchased, with the exception of an enlarged submaxillary gland. After two or three days he developed an attack of epizootic catarrh or catarrhal fever, and two or three days after that two of the regular horses became affected with pink-eye. Shortly after that, two more cases became similarly affected. We had no other case of pink-eye in our practice at the time, nor did I know of any other stable where it prevailed. This was in the same stable as the preceding outbreak, and the mare Kitty, the one which carried the infection back to the stable and caused the outbreak of contagious pneumonia, was one of those which took pink-eye. In her case, anyhow, an attack of contagious pneumonia one year did not render her immune to pink-eye the next.

In still another outbreak at a different stable where contagious pneumonia prevailed, one mare showed all the classical symptoms of pink-eye and no pneumonia.

It has been my lot to have a good deal to do with contagious pneumonia. One of our clients has over a hundred horses stabled in one yard, though in four separate stables. It is hardly an exaggeration to say that every new comer into the stable becomes affected with either epizootic catarrh or contagious pneumonia, one or the other. Many new horses are purchased, because Edinburgh is the distributing centre, so the opportunities for observation are not wanting. Moreover, many horses begin

first of all by having an ordinary "cold," then they get a sore throat, and finish up by having pneumonia, which presents all the symptons of the contagious type.

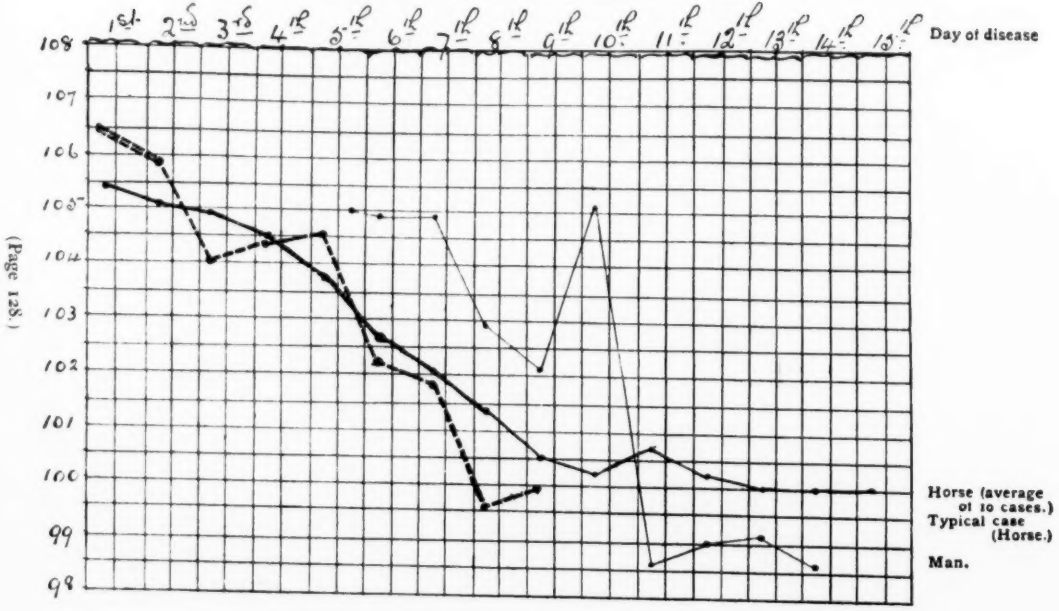
The above examples of various outbreaks lend colour, I think, to the statement that in the three diseases of the horse known as influenza, and comprising pink-eye, epizootic catarrh, and pneumonia, there is something akin, but now we know the *rôle* of the Pasteurella organisms, and that of the secondary infections, the comprehension of the different clinical types is much simplified for us.

I am inclined to think that in the contagious pneumonia there is a plurality of organisms rather than the one (the diplococcus of Schütz) responsible for the lung lesions. I have prepared sections of lung and found them literally teeming with organisms, both those taking Gram's stain and those not doing so. Moreover, I have ceased to regard contagious pneumonia as an inflammation of the lungs pure and simple, and comparable to pneumonia of the human subject, for nearly all the fatal cases show well-marked indications of gastro-enteritis in addition. I have known horses practically recovered from pneumonia suddenly become affected with enteritis and die in a short time. Others also have died quite suddenly from clots in the heart or large vessels.

Nocard and Leclainche class pneumonia as a complication of pink-eye, in fact they say it is the commonest one. Now I have seen pneumonia cases showing eye symptoms like pink-eye, but the commonest colour of the conjunctival mucous membrane is some shade of yellow, generally a dirty yellow. This I hold is evidence of a septicæmic affection, the old so-called hæmatogeneous jaundice, and not due to catarrh of the bile duct. Another thing which strengthens me in that belief is that for the first few days at any rate one can hardly ever demonstrate any pneumonic lesions either by percussion or auscultation. This conclusion I have arrived at from numbers of observations. The lung chiefly affected is, I think, the left, at that part just behind the heart. A word about the temperature curve in pneumonia; in the horse the thermal curve is quite different to that found in a case of pneumonia in man. In human pneumonia the temperature rises rapidly, and having reached the fastigium remains constant, then about the seventh or ninth day there is a sudden drop down to nearly normal. The crisis is the most remarkable single phenomenon of human pneumonia. In equine pneumonia the onset is perhaps as sudden, the temperature very quickiy rising to 105° or 106°, but in an ordinary case there is no period of crisis; the temperature as a rule falls a little each day, though in some cases about the fifth or sixth day there is a drop of 1·5 to 2 degrees. I hand round a chart with the thermal curve in a typical pneumonia case.

In contagious pneumonia we meet with varying degrees of the severity of the affection. The discharge from the nose I consider a good guide to the intensity of the lesion. Mild cases show practically no discharge, cases a little more severe have an amber-coloured discharge, not well seen if a nasal catarrh complicates matters. More severe cases still have a discharge which is well defined by the words prune-juice-like. Many of you have no doubt seen cases answering to the above degrees of severity. There is still, however, I think, another more severe condition, perhaps some of you have met with it also. I have come across some dozen or so of cases where the discharge was actual blood. The course of such cases

TEMPERATURE CHART OF PNEUMONIA IN HORSES AND MAN.



This photo, which has been kindly sent us by Vet.-Lieutenant F. H. Shore, Army Veterinary Department, shows the bath and method of dipping horses affected with mange in South Africa. As our readers are probably aware, mange existed to a terrible extent in that country.

was somewhat as follows : The animal, apparently well one day, was noticed to be blowing heavily the next, and on examining his nostrils black blood is found running down in more or less quantity. The pulse is about 80 or 90 and very weak, the temperature 105° or so. The symptoms became quickly aggravated and the animal generally dies in about 24 or 48 hours. Most of the cases came from badly ventilated stables. Few cases rallied, but one or two did, only to be affected later on with gangrene of the lung. This of course caused death.

On post-mortem the lungs are black and hepatised. Microscopic sections of these lungs show rather a curious lesion. Under a low power one sees bundles of acicular crystals which shoot out in all directions. These are the most striking feature and arrest the eye at once. The pneumonic changes proper are not very marked, the vessels are congested. and here and there we find a few catarrhal cells or leucocytes *plus* fibrin in the alveoli.

This peculiar lesion is not described in any of the text-books, either English or Continental, with which I am acquainted, nor can I find in any works on pathology any reference to it. I have shown the sections to several pathologists, all of whom on first sight thought the appearance was due to something extraneous in the preparation. Two gentlemen (one of whom was Dr. Dean, examiner in Pathology to the R.C.V.S.) to whom I gave pieces of lung to cut and stain for themselves, have obtained similar results. Dr. Dean[1] says it is something he has not met with before. I had come across the lesion so constantly in sections that I felt sure it was not in the cutting or mounting of them. What are the crystals? That is a difficult question to answer.

I have examined them by the polariscope, and they are not inorganic. The most feasible explanation I can suggest is that they are some derivative of the hæmoglobin of the blood, and that they are produced at death. I am convinced in my own mind that these cases showing the hæmorrhage from the nostrils are cases of contagious pneumonia of an extremely virulent type, and I think it perhaps likely that the toxines of the organism have caused solution of the red cells and liberation of the pigment into the plasma. You will see under the microscope specimens showing the crystals, and also in the microphotograph. The pigment in the plasma will most likely have crystallised at death. On examination of the sections with the spectroscope to see if the crystals were hæmoglobin, nothing could be made out. They are too thin and the stain masks the effect.

With regard to the actual cause of contagious pneumonia our views must be modified since Lignières' researches. The diplococcus of Schütz, which was given as the organism responsible for the pneumonia (and which, by the way, has been shown to be identical with the streptococcus of strangles) intervenes only secondarily. The Pasteurella prepares the lung tissue, and the diplococcus of Schütz which is present without causing any lesions in the healthy lung becomes pathogenic. It invades the lung and produces its characteristic effects. It is a secondary infection ; then on top of this secondary infection we sometimes have a tertiary one in the shape of gangrene.

[1] Since writing the above, Dr. Dean, being interested in the condition, made some experiments with horse's blood. The blood of a healthy horse was allowed to clot, then sections made of a clot. In the centre of the clot identical looking crystals were seen. The above conditions may be due to large hæmorrhages into the lung tissue and then coagulation.

A rather curious fact in connection with the different clinical manifestations of equine Pasteurellosis is the difference in the mortality. The catarrhal form is quite a benign form, and I cannot recollect a death from this if uncomplicated. The mortality from pink-eye varies; some years the attacks are mild and hardly a death is recorded; at other times, especially amongst cart horses, the mortality is pretty heavy. The mortality from pneumonia is, I think, greater than the other two forms, but this is to a very large extent dependent on the sanitary surroundings; if good hygienic principles are not observed, gangrene of the lungs, followed by certain death, is the result.

A curious feature about these three forms is the difference in the degree of contagiosity; pink-eye at times ravages the whole county, pneumonia is generally endemic, epizootic catarrh remains often confined to one stable.

As sequelæ to contagious pneumonia, in addition to the more common ones, I have met with one case each of broken wind, alopecia, and fibrinous iritis. In the case of alopecia the animal after an attack was left extremely weak; in a few days the hair on various parts of the body began to fall out; the patches were of irregular size and shape, many were completely denuded of hair, others were only partially so. There was practically no itching, and the skin in the majority of the spots was as smooth as if it had been shaved; the insides of the legs and the neck were almost bare and quite smooth. After a time a new growth of normally coloured hair recovered the spots.

The age of animals affected with these three clinical types is worth noticing. Pink-eye affects animals of all ages and seemingly indiscriminately, pneumonia has a preference for the younger animals. I am sorry I cannot give you the exact figures of the proportion of animals attacked at the different ages, but speaking from memory I should say that more than half the cases are five or six years old. This fact is interesting; we know that as a horse gets older he becomes more immune to strangles; similarly, then, he seems to become less liable to be attacked with the same organism causing pneumonia. I cannot say if an attack of strangles protects a horse against pneumonia, but I look upon one attack of pneumonia as conferring a good deal of immunity. Cadiot relates an interesting incident regarding immunity. In a French regiment of 780 horses 64 became affected with contagious pneumonia, mostly four and six year olds; very curiously, out of 79 five-year-olds not one became affected. It turned out that these 79 horses had the year before at the remount depôt been concerned in an outbreak of contagious pneumonia and that many of them had had it.

Let us just glance at the methods of infection in the three forms. One is apt to refer an outbreak always to aërial infection, and certainly this is one method of spread. A horse, say, from a dealer's stable or a livery stable if brought into another stable rapidly infects the horses therein, the spread of the disease indicating the contagium to be volatile. I think, however, that we are a little apt to lose sight of another mode of entry of the organism into the system, viz., by the digestive tract. It seems to me very likely that those outbreaks which occur say on farms away from contact with other horses are thus explainable. Once the organism has gained entrance to an animal its virulence may become increased. These Saprophytic organisms vegetate in the soil, so it seems natural to conclude that the fodder becomes contaminated. The food stuffs or water may become infected also by the dust from the intestinal discharges, or from

the nasal discharge of affected animals. The sojourn of an animal for a short time in an infected stable, loose box, or railway truck will give the disease, but here the demonstration of the mode of infection is not always easy. Another very curious method of infection is by coition, the male animal in these cases presenting no signs of illness. This only takes place in pink-eye, as far as I am aware.

There is a disease described by Dieckerhoff under the title of ephemeral pneumonia which is characterised by sudden rise of temperature, quickened pulse, and great increase in the number of respirations. On auscultation nothing much can be made out except a roughness in the vesicular murmur. In about 24 hours all the symptoms have disappeared. Nocard and Leclainche also propose to class this as a Pasteuralla infection. As to its etiology I prefer to keep an open mind. The disease is not exactly like what in this country is called simple fever, because the great increase in the number of respirations is the most striking point. The following case is a good example. A black cart horse standing in the stable all day towards evening began to "blow." I saw him at 7·30 p.m. and his temperature then was 106·9° his pulse 80°, and his respirations 55 per minute. Next morning at 10 a.m. his temperature was 101·2°, his pulse 42°, and respirations only 14. Truly a remarkable drop all round.

HAIRPIN IN TONGUE OF HORSE.

BY JAMES ASHTON, M.R.C.V.S., BOLTON.

A FEW weeks ago I was called from my surgery by a man who informed me that he had brought a horse into the yard which he thought was choking. Upon going out to examine the subject, I found a brown van horse about sixteen hands high, and from the manner of its behaviour and appearance I at first thought that the man was right in his opinion. But amongst the most common manifestations of choking there was one symptom that was most peculiar and pronounced, viz., the animal continually brought his head and face down between his fore legs below the knees, and, bringing pressure to bear, would withdraw the same for a few moments during which times he would screech and attempt to swallow, when he would go through the same performance similar to the manner that a dog or cat behaves when they have a bone or some other substance fast between the teeth.

There was a continual champing of the jaws, pawing with the fore feet when the head was not there, and a copious flow of saliva.

A gag was placed into the mouth, and what I considered a thorough examination of the cavity made under difficulties, but without being enabled to discover any obstruction, nor could I trace any along the course of the œsophagus.

A little oil was given and this was partially returned by the nostrils.

At this time it was suggested that I should pass the probang, but not feeling really satisfied that the case was one of choking, and taking into consideration the peculiar symptoms mentioned above, I decided to make another examination of the mouth, and this time my patience was rewarded by coming in contact with something on the superior surface of the tongue at its base, projecting which, upon further examination, I concluded was a piece of wire.

By pulling the tongue forward I attempted to get hold of the slight projecting portion between my finger and thumb, but owing to the poor hold I could get, the firmness with which it was fixed, and the restlessness of the animal, I was unable to do so.

I now decided, having discovered the cause, to cast the animal. This having been done upon a good bedding of straw and a quantity placed under the side of the head and neck, the gag was again introduced, the tongue drawn well forward, and after several attempts and some difficulty I succeeded in securing the point of the wire between the jaws of a long pair of needle forceps, "Huish's," which were admirably suited for the purpose, being long and narrow, and drew out the cause of the trouble, which turned out to be half of an ordinary lady's hairpin broken off at its centre.

Upon making inquiries from the driver, I found that in the morning he had taken with him from his home a quantity of potato peelings and added them to the feed, and in this way no doubt the wire gained admission to the mouth. Previous to feeding the animal was all right. The shape of the wire when drawn out was similar to the letter V inverted, and no doubt the bending of the same in this manner would account for the force required to draw it out.

There was little or no tearing of the tongue, the wire having come out cleanly.

The animal was put on gruel and linseed tea for the day, the trouble having occurred in the forenoon, and the following day, the man being busy and the horse showing no unusual symptoms, he was put to work, and up to now he has continued to do so without interruption.

Chloroform was not used, not having the necessary appliances by me, and in my opinion the urgency of the symptoms and signs of distress required prompt action.

AMPUTATION OF THE RECTUM IN A PUPPY.

BY HENRY TAYLOR, M.R.C.V.S., NEW VETERINARY COLLEGE, EDINBURGH.

THE subject was a young pug dog about three months old. It was admitted suffering from eversion of the rectum, the bowel protruding to the extent of 3 inches or so. The parts were washed with an antiseptic, the animal chloroformed, and then the bowel was returned. It was found impossible to do without an anæsthetic, owing to the straining. A purse suture was afterwards applied to the anus to prevent a recurrence. This was left in for twenty-four hours and then taken out, the animal meantime being kept on liquid diet. A day or two afterwards the puppy was found one morning with 4 inches of the rectum hanging out, the mucous membrane of which was red, swollen, and in places excoriated and torn.

The puppy was at once chloroformed. A circular incision was made right round the bowel immediately behind the anus, completely severing the connection between the sphincter ani and the posterior part of the rectum. The gut was now pulled out of the anal opening a little further, so as to make sure that all the swollen part would be excised. Next the bowel was cut half-way through the anal orifice, *i.e.*, it was severed as far as its transverse diameter. The semicircular segment next the anus was then

sutured to the upper part of the anus. When this was completed the remainder of the bowel was cut through and sutured in a similar manner to the lower part of the anus. An opiate was given and the animal fed on soft food for the next week or so. The day following the operation there was a little swelling of the anal region, but this soon subsided. Recovery was uneventful. I saw the animal about six months afterwards and there was no trace of any operation.

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NATIVE VETERINARY SURGERY IN THE ARGENTINE REPUBLIC.

BY JOSHUA A. NUNN, F.R.C.V.S.

THE following remarks have been kindly furnished by Major Douglas, 2nd Dragoon Guards, who was on remount duty in South America :—

I.—*For lameness in the off hind or fore limb.*—Tie some strands of horse hair round the near hind or fore, and *vice versa*.

II.—*For a Purgative.*—Tie a strip of cloth from the garments of a newly born baby to the horse's tail.

III.—*Diuretic after Work.*—Turn the horse in a sheep corrall, so that he can inhale the dry sheep-dung. If not successful blow pepper up his nose.

IV.—*Diuretic if the Horse has not been working.*—A raw onion is peeled, sprinkled with pepper, and inserted into the sheath.

V.—*Sore Backs.*—The feet of a young colt is considered a certain cure.

VI.—*Sores and Wounds.*—Aguardient or native wine is used for curing sores, also for bathing the back after a long ride.

VII.—*Influenza.*—Eucalyptus leaves are boiled and the steam inhaled for half an hour three times per diem.

LOCAL NAMES FOR VARIOUS COLOURS.

Grey, tirdillo ; white, blanco ; black, negro or oscuro ; bright chestnut, alzan dun lubono ; bay, colorado ; dark bay, zaino, also zaino negro, and zaino oscuro ; iron grey, moro and moro negro ; roan, bayo and bayo negro ; strawberry roan, rossillo ; dark roan, doridillo ; light dun, gateado ; curly black, crespo ; black, with white face and stockings, patigo and picago ; bay, black points, with white face, mala carra ; piebald, overo ; skewbald, manchardo.

OLD FRACTURES AND THEIR RESULT.

BY MAJOR J. A. MEREDITH, 1ST LIFE GUARDS, WINDSOR.

A TROOP mare of the 1st Life Guards, aged ten years, was seen by a sentry about 1 A.M., on 18th December 1903 to suddenly stagger and fall without any apparent reason, and this was followed by inability to get up again.

At 1.30 A.M. I visited the patient and found her suffering from paralysis of the hind limbs, with symptoms that denoted interference with nervous and vascular supplies. Attempts were made to get the animal on her legs, and she was finally conveyed to hospital where she was raised with slings. No sensation existed in the hind limbs, and there was inability to use them. Prognosis was unfavourable, and being in pain, I had her destroyed about 10 A.M. on 18th December.

Post-mortem.—Revealed an old fracture of the transverse process of the sixth lumbar vertebrae, the floor of the pelvis and acute inflammation of the sacro-iliac articulation on the off-side. The paralysis was due to pressure on the crural nerves, and also there was effusion in the spinal canal. The case was hopeless from the first.

Note.—This animal was generally in poor condition and required extra care. Sweated on the least exertion, had a peculiar gait, and always cantered with both hind legs coming to the ground at the same time or nearly so.

EXTENSIVE INJURIES FROM TRACTION ENGINE ACCIDENT TO HORSE.

BY CAPTAIN F. H. SHORE, ARMY VETERINARY DEPARTMENT, ALDERSHOT.

THE following case, being of a somewhat unusual nature, and attended with such extensive injuries, may be worth recording:—

On a frosty morning in December a mounted orderly encountered a traction engine, of which apparently his horse took no notice until almost opposite it. Then the animal appears to have swerved across the front of the engine, attempted to scramble on to the bank by the side of the road —which, by reason of its slipperiness, due to the frost, gave no foothold— slipped back, and fallen in front of the engine, which could not be stopped in time, and so passed over the hindquarters of the horse, the man having a narrow escape.

The horse died in a few moments.

Post-mortem showed—

(*a.*) An extensive rupture of the posterior aorta.
(*b.*) Both ilia fractured.
(*c.*) Second and third coccygeal vertebræ fractured.
(*d.*) Both ischial tuberosities knocked off.
(*e.*) Fracture of the neck of the near femur.
(*f.*) Near tibia fractured, the upper part projecting through the skin for some inches.
(*g.*) Near hoof crushed flat, and torn.
(*h.*) Os pedis and os corona crushed to pulp.

What seems very strange to my mind is that there was no fracture of the pubis or of the symphysis pubis, and that the ischial tuberosities should have suffered. Apparently stifle and hock must have been flexed when the engine struck, otherwise the hock and metatarsal bones must have suffered.

I have omitted to mention that the engine was running backwards at the time to hook on some trucks.

Possibly the driver, in trying to stop the engine, made things worse, as it was too late to do any good, and only made the weight more stationary on the top of the horse.

A FREAK OF NATURE.

BY A. SCOTSON, V.S., HATTON.

ON Sunday, 31st January, I was called to see a female calf, which was born on the Friday before, and was told by the farmer that it had no passage. Thinking the calf would likely be constipated, I took the necessary medicine, and also my injection pump. On my arrival at the farm, and examining the calf, I found that the farmer was quite right in more ways than one, as I failed to find a rectum, although the vagina was in its natural position. On pressure at the site where the rectum should have been, I found it slightly hollow, and decided to risk an opening, which I did, using my finger to force a way after cutting the skin. About 1½ inches I came upon an opening, which I took to be the rectum. I gave an

injection, which was returned about three minutes after without any discoloration or fæces. I told my client to inject once or twice a day, and after giving a dose of castor oil to the calf I left, promising to call in a day or two. On my return, I learned that the calf had passed some fæces with a little pus. I left some antiseptic lotion to syringe out with, and to let me know how it proceeded. I have learned since that the calf is doing well, with no appearance of any ill effect in my effort to improve on Nature's handiwork.

GLANDERS AND DRINKING TROUGHS.

BY GUY H. GUILLUM SCOTT, BARRISTER-AT-LAW.

A deputation of horse-owners, convened by the Federation of Associated London Cab Proprietors, waited upon the Public Control Committee of the London County Council yesterday to call attention to the continued prevalence of glanders among horses, and to urge upon them the necessity of introducing a more safe system of street watering other than the present system of public water troughs, which are partly supported by public subscriptions and partly by the local authorities.

In reply it was stated that the committee were in communication with the Local Government Board with the object of securing a grant to allow of increased compensation for the owners of slaughtered horses. The committee, however, had an open mind on the question of street water-troughs.

The above may be of interest to those members of the veterinary profession who have not already seen it. The subject is one upon which professional opinion differs somewhat considerably, as was shown very recently at a Meeting of the Council of the Royal Society for the Prevention of Cruelty to Animals. The Society had received a request from the Cattle-Trough Association to support a movement for re-opening certain troughs which had been closed by the local authorities for some months past, and it was stated in support of this that one of the leading veterinary surgeons of the day had expressed his opinion that little or no risk of spreading glanders was run by the use of public troughs. On the other hand, two eminent veterinary surgeons present at the meeting declared most emphatically that they considered these troughs a source of the utmost danger in this respect, and one of them cited instances which had come within his experience of cases which certainly tended to show that there was considerable grounds for suspecting that such a danger did exist.

In these circumstances, and having regard to the dangerous character of the disease, which is said to be very prevalent at present in London, any suggestions which may in any way tend to lessen the risk of infection must commend themselves alike to owners of horses and public authorities having control over such matters.

PRESIDENTIAL ADDRESS[1].

BY MR. S. WHARAM, M.R.C.V.S.

GENTLEMEN—To-day I have the honour and privilege of addressing you as President of this Society, which is one of the oldest in the Kingdom, and has numbered amongst its members some of the most notable men in our profession. The Society's history is too long and varied for me to give even an outline of it in this address; it has experienced both ups and downs, but for the last few years we have made steady, if slow progress, and I trust we shall continue to improve both numerically and financially. I regret, however, that on this occasion the attendance of members is small.

I should like first to say a few words about antiseptics and disinfectants, which play such an important part in our every-day work. Our duty, and I presume it will or ought to be part of our business in the future, is to prevent as well as cure disease. It is the prevention of disease amongst horses to which I wish particularly to draw your attention, for in this country, in fact—in the county of York—a vast amount could annually be saved to the owners of horses by a systematic administration of preventive measures conducted by the veterinary profession.

The Board of Agriculture control some of the contagious diseases, but up to the present time, with the exception of stamping out pleuro-pneumonia and rabies, their administration has not proved to be the success expected of it, and I venture to suggest that a considerable portion of the failure of the Department to mitigate the ravages of disease is by not enlisting the sympathy and assistance of the entire veterinary profession.

But I will leave the work of the Board of Agriculture for the present. I want to point out how much sickness and death might be prevented by the cleansing and disinfection of stables and horse boxes. The sanitation of many stables in every part of the country, and especially in large towns, is very much neglected. There is not any registration, and horses are kept in all sorts of holes, imperfectly lighted and ventilated. Cattle trucks are cleansed and disinfected, but there are no regulations, as far as I am aware, for the same process to be applied to horse boxes, and it is quite a common occurrence for horses after a railway journey to commence with a contagious disease contracted in the box.

With reference to methods of disinfection, I think the usual one of lime wash can be improved upon. It has great disadvantages, causing in some instances considerable inconvenience to the animals by burning the skin. The use of plenty of water, scrubbing, and suitable fluid disinfectant is the best, leaving all clean and sweet; it also flushes the drains. Tar varnish is good for stables and sheds; it can easily be washed, and does not rub off.

The Board of Agriculture and Fisheries is a department of considerable scope, the section dealing with the diseases of animals being only a small portion of its work, but it is to us the most important; and agriculture, which is yet the greatest industry of these islands, looks to the Board for advice and protection.

What agriculturists and stock-owners require in these days of depres-

[1] Read at the Annual Meeting of the Yorkshire Veterinary Medical Society on the 29th January 1904.

sion—in fact, at all times—is substantial help in the shape of adequate compensation for animals lost or condemned, and not irksome Orders causing them increased trouble and expenditure. I am convinced that glanders, swine fever, and anthrax, and even tuberculosis, and some other contagious diseases, could all be stamped out, thereby eventually saving the country at immense amount of money. For glanders and tuberculosis we have tests which are certainly open to abuse, but the sale of both mallein and tuberculin should be controlled. Glanders is increasing, and I suppose the only reason for such increase is that horse-owners are not disposed to destroy useful animals if moderate compensation is not forthcoming. Some local authorities pay compensation, but the present system is only palliative. All reactors should be destroyed where glanders exists, and a sufficient compensation paid to secure the co-operation of horse-owners throughout the country.

One more observation on the methods of the Board of Agriculture before I pass to another subject. Not far from this room a contagious disease existed, and although numbers of people visited the place and knew what the affection was, some days elapsed before any precautions were taken to prevent the spread of the complaint, and no one in Yorkshire had authority to say whether the disease existed or not. The owner and several neighbours expressed their contempt for the Board and its work. Under such circumstances success is difficult to attain.

It has always seemed to me that our fees for visiting and advice are too small compared with the amount charged for medicines. Two and six for a visit and advice, the customary charge within a radius of about two miles, is in my opinion too small a fee. We prescribe and supply medicine, which improves the charges, but is not that wrong in principle? I believe by charging higher fees for our visits we should eventually benefit ourselves.

Much has been said about having some representation in Parliament. I do not believe a deal could be gained by a single member, but I do advocate our members obtaining seats on the councils of local authorities, as, in addition to furthering and safeguarding the interests of the profession, a V.S. is certainly an acquisition to any Council.

A presidential address should be marked by brevity, but I cannot conclude without reviewing the year 1903, which has been one of considerable moment to our profession. The A.V.D. have obtained a warrant satisfactory, for the present, to the Department and the profession; and we have been promised a University Degree,—both distinct advances scientifically and socially, but what has been the lot of the overwhelming majority of the profession—the general practitioner. Many people constantly overlook the practitioner, and imagine the entire interests of the profession lie in some insignificant portion of it, such as meat inspectors, the A.V.D., or other small section, all of them admirable in their way, and all of them I hope will furnish increased employment and prestige for our graduates in the future.

The practitioner has chronicled a remarkably healthy year amongst his patients. An increase in electric traction and automobiles, and a comparative reduction in the numbers of stock collectively, have resulted in a similar reduction in his income. This state of things may revive in time and return through other channels, but fresh sources of revenue are difficult to obtain, and when they do come one is often in the same position as a man after a strike—unable to make up what has been lost.

I admit I do not hold any bright prospects for the future of our profession; I am afraid it will follow in the footsteps of agriculture, and I should warn any one who is thinking of entering it, unless they can specialise, to look out for contingencies and hard work. We are certainly undergoing a change, and though there will always be useful work for the V.S. to do, for the new graduate to commence and make his living by, legitimate veterinary work is only the lot of the lucky ones, and I earnestly wish our young members who are compelled to take or have drifted into other occupations more remunerative than they could have expected if they had practised their profession. (Applause.)

Translations and Extracts.

POISONING BY FOOD IN HORSES.

BY MM. DECHAMBRE ET CUROT.

THE etiological and pathological conditions that arise from the poisoning of animals through food, show of themselves the importance of carefully examining forage, and the necessity that it should be in such a form, as to be able to separate from it deleterious matters. The subject will be treated in the following order.

1. Poisoning by altered and irritant foods—
   - A. Mycotic gastro-enteritis.
   - B. Infectous paraplegia.
   - C. Irritative gastro-enteritis.
2. Poisoning from noxious plants—
   - A. Plants mingled with forage.
   - B. Noxious grain.
   - C. Noxious cakes.

A. MYCOTIC GASTRO-ENTERITIS.

Under the name of Mycotic gastro-enteritis are classified accidents from damaged foods and drinks.

Food that has become damaged by mould, fungus, parasites, and micro-organisms are a common cause of disease. The cryptogama that grow on forage are numerous, and even on hay of the best quality, in company with harmless organisms, numerous pathogenic forms exist, which remain harmless as long as the system is in a condition to resist them, but when the mucous membrane of the intestine allows of their entrance into the lymphatic system, the condition of the body is such as to be able no longer to withstand their attacks, and trouble arises.

Hard, woody, and tough forage that is imperfectly masticated by animals with bad teeth, causes mechanical irritation of the intestine, and from these primary injuries of the mucous membrane secondary infection arises, causing mycotic enteritis. The infectious agents, which are inert while the intestine is in a healthy condition, become dangerous as soon as a channel is opened to enable these to penetrate into the circulation, and this fact is of the greatest importance from a hygienic point of view in the preparation (mixing, crushing, and division) of the food of the domestic

animals, so as to ensure that the necessary mechanical processes of digestion are properly performed.

Galtier and Violet have found in two different micro-organisms (Diplococcus pneumo-enteritis and streptoccus pneumo-enteritis), the cause of the typhoid affections that result from eating damaged food. Lignieres has proved that the liquid obtained from the macceation of hay and oats when injected under the skin of the rabbit is fatal. The micrococci, streptococci, diplococci, streptococci pyogenus, staphylococci pyogenus, and the bacillus coli, which normally exist on forage, are all capable of causing accidents when taken into the intestine in large numbers, or when the mucous membrane of the bowel is injured, also when the system is in a weak condition from bad or insufficient food.

The addition to the microbian flora, properly so called, are moulds, rust, and smut.

1. *Moulds.*—The moulds are fungi, which chiefly belong to the order of Phycomycetes and Asomycetes.

Note.—The fungi are divided into four natural orders, Myxomycetes, Phycomycetes, Basidiomycetes, and Ascomycetes.

The most important groups of the Phycomycetes are the Mucorices, genus Mucor, example Mucor Mucedo, the most common of all, and found everywhere, genus Rhizopus, genus Tham. Midium, genus Phycomyces, &c.

The peronospores, example Peronospora viticola, or mould of mildew, Phytophtora infestans, or mould of potato disease.

The Saprolnices, an aquatic mould. Saprolegnia ferox the mould of wet bread.

The Entomophtorees example, Emposa muscæ, that attacks flies in the autumn.

Most of the group Ascomycetes are only imperfectly formed, but there are some the true form of which is unknown, and these are classified under the name of Mocediness, as for example the Bothrytis cinerea, which develops on white grapes in central France in damp weather.

Genus aspergillus, A. glaucus, A. firmigatus.

Genus penicillum, P. glaucum, P. crustaceum.

Genus Sterigmatocystis, S. nigra (formerly aspergillus). Niger of Ravlin. The mildew of leaves, such as the orange leaf, belongs to this group; example, Fumago vagans.

The muscadines mentioned are the simple variety, with separate filaments, but there is a second group with conjoined filaments; example, Tubercularia Vulgaris, which forms small orange-coloured veins on dead wood. (Note the champignous of Trignes, which have been described by Matruchot and Dassonville appear to be Mucedices.)

Moulds usually appear in the form of coloured patches (white, green, or yellowish green) formed by the mycelia that grow from the substrata on which the growth develops. They have spores or conides on them, which are the reproductive organ, and which are the visible portion of the growth, and are of the same character as those in the substrata, and which decompose it by their secretions.

The mycelia in the mouldy substance cause alteration in its tissue by the elaboration of toxines in the same way as those elaborated by microbes, and which after injection of damaged food give rise to local disturbances that may become more or less generalised.

The general toxic action of these moulds is characterised by contraction of the pupil, paralysis of the vaso-motor system, diminution of the respiration, loss of power of muscular contraction, drowsiness, and a little before death convulsions.

Mouldy hay, oats, meal, and bread causes dangerous enteritis and gastro-enteritis, expecially in horses; and Repiquet has seen gastric enteritis in the horse from this cause that closely resembled typhoid fever, but there can be little doubt that the toxic symptoms are not caused by the fungus itself, but the secretions emanated from them.

2. *Rust.*—The most common is the Puccinia graminis, which attacks cereals. The use of rusty straw gives rise to tympany, constipation, and other serious troubles, if its use is continued, the active cause being the same as the moulds.

3. *Smut*, of which the type is the Tilletia caries, will cause enteritis, and, like all allied moulds, bronchitis and pneumonia if the smut penetrates into the bronchii. Grain attacked by caries has a disgusting smell, which remains when converted into flour. The individual grain is completely filled with a dark-coloured powder from an accumulation of the spores.

A question arises, if the fungi attacking cereals have of themselves a toxic action, or if this is caused by some alteration that takes place in the host. This problem has not yet been properly solved, but the available evidence points to the second theory. Dr. Emhoff has taken 3 grammes daily of Ustilago maidis for fourteen days without any ill results, but it must be remembered that this smut is one of the least harmful, and Dr. Cordier has applied the same test to himself, with like results, with Ustilago segetum. Gassier also has fed fowls with considerable quantities of Tilletia caries, so it would appear as if these parasites, like all the moulds, acted by the products that they secrete, but in whatever way this is accomplished they are sufficiently injurious to be condemned if detected in the food. The poisonous properties of such damaged food offals varies in the different species of animals, and is more frequently seen in cattle than horses, from the simple fact that more care is taken of the latter; but, on the contrary, poisoning by hay, straw, and grain is more common among them than cattle.

Symptoms.—In mild cases the symptoms at the commencement are very ill marked. There is loss of appetite and constipation, and the excrements are hard and fœtid. The cause is often overlooked, and horses treated for symptoms only without a true diagnosis being made; but loss of appetite not caused by organic trouble or overwork should arouse suspicion, and the food should be carefully examined.

In acute cases the symptoms are much more marked. There is great depression and stupor. At first there is obstinate constipation, followed by profuse fœti d diarrhœa, the respirations are short and painful, and the pulse fluttering, the coat harsh and standing on end, the temperature from 40° to 40·5° Cent., and the animal rapidly falls off in condition. Suspicion should be aroused by several animals in the stable becoming ill at the same time, and only those that have received the one class of food; also that when this is changed the outbreak ceases.

In the chronic form the constipation is succeeded by profuse black fœtid diarrhœa, sometimes tinged with blood, and passed with much pain and straining

In some cases the effects are purely local—dermititis, Rhinitis con-

junctivitis, and stomatitis; but they may run on into conditions of a most serious nature, such as gastro-enteritis, polyuria running into parenchymatous nephritis, bronchitis and gangrenous pneumonia if the infectious agent penetrates into the respiratory system.

Paraplegia appears to be uncommon, but not nervous disturbance, which is usually depression, not excitation. Gangrenous gastro-enteritis is usually fatal, and we can recognise two phases, not counting the benign form:—

1. The primary stage, with loss of appetite and local symptoms.
2. Poisoning by toxines elaborated in the intestine, and becoming absorbed into the circulation.

This classification, in addition to explaining the symptoms, enables infectious gastro-enteritis to be differentiated from abdominal appoplexy, paralysis, and paraplegia resulting from poisoning by damaged food.

Lesions.—The gastro-intestinal mucous membrane shows the appearance of congestion and inflammatory action. The small intestine is coloured a deep yellow from the bile, and the large parcipitate, but in a lesser degree. There is softening and congestion of the liver, sometimes accompanied with nephritis, and a slight degree of hyperæmia of the nerve centres.

Treatment.—The suspected food must be at once stopped. The fermentation in the intestine counteracted with 15 to 20 grammes naphthol, and got rid of by enemas and purgatives, and bicarbonate of soda given. Alasonniere recommends 500 grammes of white mustard seed in an electuary.

INFECTIOUS MYCOTIC PARAPLEGIA.

The nervous complaints resulting from poisoning usually take the form of paraplegia, and Professor Thomassen, of the Utrecht Veterinary School, has collected a number of such cases caused by damaged food. In 1899 Guillemard communicated to the Central Veterinary Medical Society of Paris an interesting account of an enzootic amongst several studs of horses that had been fed on the same food, and Comeny saw a like outbreak in 1888 in a cavalry regiment. The true cause of the outbreak is not usually recognised till several animals receiving the same food have been attacked and the forage has been carefully examined.

Thomassen reports a case due to bran, containing a large number of spores of Tilletia caries, which was detected by microscopic examination, and Fröhner one in which five were poisoned by mouldy oats of a greenish-blue colour, due to the pericellsum glaucum, which had eaten into the kernel.

Mycotic paraplegia is not always accompanied with gastro-enteritis, probably because the toxines elaborated vary.

Lesions.—Congestion of the pia mater, especially over the medulla and spinal cord, which may be so great as to cause hæmorrhage, together with serous effusion.

GASTRO-ENTERITIS.

Inflammation of the intestinal mucous membrane may be due to a number of causes, but this peculiar type is from poisoning, the result of too free a use of the offals and residues of feeding stuffs, such as molasses.

The mineral salts contained in molasses, and the acids used in distilleries will cause intestinal irritation if given in too large quantities for too

long a time, and dessication of the distillers' grains will not diminish them, and if the food containing them gets damaged the effects are worse.

A case occurred at the Agricultural School of Gembloux, Belgium, where a number of pigs were poisoned from wet maize grains (poisonous properties of maize grains,—Masson and Gregoire, *Ingenieur Agricole de Gembloux*, 1896). The food had undergone fermentation, and contained 1·27 per cent. of free acetic acid.

In the majority of cases the lesions are inflammatory without destruction of the cells, the acid not being sufficiently concentrated to act as a caustic, but the condition of the mucous membrane is favourable to absorption of toxines and murates, and the manifestation of secondary symptoms. The gravity and prognosis of the case is very variable, as it may vary from a slight degree of intestinal congestion to fatal gastro-enteritis.

The patient suffers from colic, diarrhœa, and disturbance of the circulation and respiration, dullness, stupor, the coat standing on end, and if the case becomes chronic, rapid emaciation. The blood has an acid reaction, being charged with phosphate of urea, and as a consequence alteration in the consistency of the bones, with a tendency to fracture.

In poisoning by over-feeding with molasses, intestinal derangement appears following urinary trouble, polyuria being the first symptom of intolerance to the salts contained in it. We only mention this fact in passing, as we have entered fully into the whole question of molasses as a food in another work.—*Vide*, "The Use of Molasses as a Feeding Material," by E. Curot.

Treatment.—Change of food is the first and most important step. Enteritis, if present, is treated in the usual manner; internal antiseptics are employed to prevent secondary symptoms, and alkalies to neutralise the excess of acids. During convalescence the animal should be kept on slops. Once the acute symptoms give way, the patient rapidly recovers, and if the season and weather permits, a run at grass will effect wonders.[1]

Over-work and the resulting weakness is no doubt a predisposing cause of poisoning from damaged food, and horses that are *stale* from excessive work without doubt are in a condition most favourable for the invasion of pathogenic microbes.

[1] Certain substances, residues from manufactories, enter into this catalogue, particularly distillers' grains, which even after dessication still contain a certain amount of the acids used in the process of distillation. Moussu, however, disputes the noxious effects of acid food, at least as far as the ox is concerned, and points out that certain breeds of cattle reared on such forage are excellent working animals, and rarely are affected with diseases of the bones.

All the same, acid food should not be given to working horses, and certainly not to young animals, as it causes a deficiency of phosphates and mal-nutrition of the osseous system.

The following note is taken from the case of an animal that was in a most debilitated condition from enteritis, the result of feeding on damaged food:—

Weight on 28th April 1902,	. .	450 kilogrammes.
,, 27th May,	. . .	525 ,,
,, 15th December,	. .	550 ,,

The patient got a little hay, but he gained 75 kilogrammes in thirty days, and no doubt the rest after hard work on the paved streets of Paris had a considerable influence, also the bulky nature of the food,—"Les Aliments du Cheval," Dechambre et Curot, pp. 405-18.

(*Bullétin de la Société Central Vétérinaire*, Feb. 1903.)

POISONOUS PROPERTIES OF YEW LEAVES.

SOME experiments as to the nature of the poisonous properties of yew leaves were lately made by the principal chemist of the Government laboratory for the Board of Agriculture, and have been published in the Transactions of the Chemical Society ('Taxine,' by T. E. Sharpe, C.B., F.R.S., and George Stubbs. Transactions, Chemical Society, 1902, vol. 81, p. 874).

Considerable difficulties were at first encountered in obtaining a sufficient quantity of the alkaloid. By various methods from 0·07 to 0.12 per cent. (calculated on the green leaves) of taxin was obtained in preliminary work from female yew leaves. Subsequent treatment of male leaves gave 0·18 per cent. Although this amount is greater than that obtained from the female leaves in the preliminary examination, the inference cannot be drawn that the actual quantity present in the leaves was greater, the substance undergoes change so very early that the quantities first yielded are thought to be too low. There appeared to be no difference in the quantity yielded by fresh and air-dried leaves.

The taxin, after drying in a vacuum, presented the appearance of very fine glittering particles, extremely light, with no smell, and a very bitter taste.

The physiological action of taxin was examined in 1876 in Germany, and it was stated that when administered to frogs, rabbits, cats, and dogs it depresses the action of the heart, and interferes with the respiratory functions, death ensuing from suffocation in a short time.

(*Journal of the Board of Agriculture*, Sept. 1903.)

BIRD PLAGUE (*PESTE AVIARIE*).

BY M. E. LECLAINCHE.

UNTIL lately all diseases of fowls were classified as cholera, whether enzootic or epizootic, which were fatal, and characterised by somnolence, diarrhœa, and dark coloration of the crest and mucous membranes. The differentiation of the different hæmorrhagic septicæmias of birds have not altered for practical purposes the diagnosis or treatment, all being due to an "ovoid bacillus," much akin to that of cholera, and the differences in the diseases they produce are so trifling as to be insignificant, and they are amenable to the same treatment. In 1880, however, Pivotta and Delprato, in the country about Pisa, observed a disease among poultry which they distinguished from fowl cholera under the name of exudative typhus, on account of its gravity and the presence of inflammatory exudations into the cavities, in particular into the peritoneum.

From 1894 to 1900 it was reported from most parts of central Italy as an epidemic, where by some it was looked on as a true fowl cholera, by others as typhus.

The true state of things was shown by Professor Centanni de Ferrara and his pupil Gavonuzzi, who in March 1901 demonstrated that in this new disease the ovoid bacillus of fowl cholera is never present and indeed, that in the virulent fluids there is no organism that can be detected by modern methods. They have named the disease *Bird Plague* (*Peste Aviarie*), and by this it is now known. They also a little later demon-

strated that the virus could pass through a porcelain filter, and that it was impossible to get a culture on any known medium, and that its virulence depends on a micro-organism that is invisible.

In February 1901 the disease appeared in Germany after a poultry exhibition in Brunswick. It was from the first admitted that it was not fowl cholera by German investigators, who recognised the predominance of the peritoneal lesions (epizootic peritonitis of Scheorien and Buhl), and that the pigeon, rabbit, and mouse were refractory; but investigation was carried on for several months, apparently in ignorance of what had been done by Centanni.[1]

Since then it has been reported from the Tyrol, Venetia, Belgium, and all over Germany; and in France, Nocard and Leclainche have seen it in birds sent from different parts of the country.[2]

Fowls are specially liable, but it sometimes attacks other poultry, with the exception of pigeons, which, although they are extremely sensitive to cholera, are not to fowl plague.[3]

It varies much in the same way as attacks of cholera do, generally poultry yards being cleared in a few days, but in some instances outbreaks drag on for a long time, even lasting for weeks.

Symptoms.—The bird seems tired, and mopes, remains perched by itself, and does not feed, the eyes are closed, feathers on end, and there are frequent attempts at swallowing; respirations are painful, with rales, and the temperature is from 43° to 44° Cent.

A little later coma sets in, the bird being bunched up, resting with the breast on the ground between the feet, the toes of which are spread out; if raised up it staggers and falls about, appearing to be blind and taking no norice of anything; the respirations are difficult, and there is an accumulation of mucus around the beak and nostrils. The crest and mucous membranes are a reddish brown or violet. As a rule the excrements are normal, but in some cases there is a greenish-coloured diarrhœa.

In the last stages there is creeping paralysis, beginning in the legs—in some cases the bird turning round in a circle—and extending the neck, causing it and the head to be oscillated up and down. Death takes place in from one to three days after the first appearance of symptoms, although exceptionally a case will survive for from five to eight days.

Lesions.—The lesions are those of infectious toxaemia. The blood does not coagulate, the liver is friable, yellow, and undergoing fatty degeneration, and there are patches of ecchymosis over both mucous and

[1] *Vide* Nocard and Leclainche, 3me edition, vol. i. page 504. Centanni, Der Voge pest, Centralblatt fur Bacteriol, vol. xxxi. 1902, pages 145 and 182. Lode, Notizen zur Biologie des Ernegers der Kyanolophie der Huhne, Id. Id. page 480. Kunnemann, Beobachtungen uber der Vogelpest, Deutsche tierarztl. Wochenschrift, 1902, pages 413 and 421. Endens, Beitrage zur keuntniss einen neuen Infectionskronkheit, Berliner tierarztl. Wochenschrift, 1902, pages 339, 362, and 382. Ostertag and Wolffhugel, Untersuchungen uber de Huhnerpest, Monatschafte fur Thierheilkunde, vol. xiv. 1902, page 49.

[2] It is probable that bird plague has existed in France for a long time, as on several occasions Nocard and Leclainche have seen outbreaks of reported fowl cholera without being able to obtain any cultures; and the opizootic that for several years past has been prevalent in the south-east of France is with little doubt plague, it can be accounted for by the large numbers of Italian poultry now imported into France.

[3] The pheasant disease that has been studied by Enders is not identical with avine plague, and Ostertag and Woffhugel's remarks appear to be correct.

serous membrane, especially in the stomach, but not so common in the small intestine, the cloaca, mouth, or eyelids. In the peritoneum, pleura, and pericardium are sero-fibrous or whitish-coloured exudations, but in some cases there is an entire absence of all symptoms.

Diagnosis.—The character and rapidity of evolution of the disease will, of course, point out the case to be either avine plague or fowl cholera—in the latter there being diarrhœa and inflammation of the mucous membrane of the intestine. In the former the victims are limited to fowls chiefly, and pigeons are quite refractory, whereas they are very susceptible to cholera.

The diagnosis can be completed by the detection of the cholera organism in the blood and pulp of the organs, or still more simply by the inoculation of a pigeon with a drop of blood which, if it be cholera, will die in from twelve to thirty-six hours, but remain alive and unaffected if it is only plague.

The virus invades the whole system, especially the exudate from the mucous membrane and intestinal discharges, and this virulence will continue after filtration through either Chamberland's or Benkefeld's filter. The activity of the virus is considerable, a cubic centimeter of blood, diluted 1 to 125 millions, having killed fowl in forty hours.

It cannot be grown on any known medium or "*in vacuo*" by collodium capsules in the peritoneum. Both inoculation and injection cause death with great rapidity to the turkey, guinea-fowl, goose, and duck, but only in large quantities to the rabbit and pigeon. Other animals are resistent.

The contagion is spread without doubt by means of the virulent discharges, saliva, and excrements. This is less easier than in cholera, the virus is extremely delicate, and does not find the earth or soil favourable conditions for growth.

Dessication appears to affect it but little, as it remains active after twenty to twenty-five days, but it is sterilised immediately at 65° to 70° Cent., also corrosive sublimate 1 per 1000, carbolic acid 5 per cent., cresyl. lysol, &c.

Prophylaxia.—Usually it is impossible to prevent the disease spreading among a flock, and it is advisable to destroy all fowls, although animals of great value have been saved by carefully isolating them. Disinfection is easily carried out by washing with soap and potash, sprinkling with an antiseptic solution, and freely swilling down with boiling water. The fowls should be kept in a run to which small birds cannot get access, as they are dangerous carriers of contagion, and new arrivals should be subjected to an eight days' quarantine. The importance of the laws necessitate sanitary legislation. In Germany and most parts of the United States such are in force embodying notification of the disease, disposal of bodies which have to be burned, destroyed by steam, or buried in quicklime. Notice is given to the public of the existence of the disease, and at what place, and birds cannot be removed from them, either alive or dead.

Suspicious cases dying in railway trains have to be reported to the police, and if they turn out to be plague or cholera the whole consignment of fowls can be stopped.

Disinfection is recommended by sprinkling the locality with a 3 per cent. solution of chloride of lime, scrubbing the floor, walls, gables, &c. of the fowl-house with a 5 per eent. solution of milk of lime, and well scrubbing out the troughs, &c.

As regards poultry shows, they are only held under the supervision of the veterinary sanitary authority, and all exhibits must be accompanied with a certificate that for six weeks there has been neither fowl cholera, plague, or other contagious disease in the neighbourhood. This is carefully carried out, because poultry shows are looked on as a great factor in the spreading of disease.

(*Revue Générale de Médecine Vétérinaire*, 15th January 19

CACODYLATE AND "DOPING."

BY M. DALLIS, VETERINAIRE EN 2EM 9TH CHAUSSEURS.

I THINK that perhaps it might be interesting to mention some of the good effects of cacodylate with convalescent animals, particularly those recovering from diseases of the chest, and as this drug is used as an adjavant in the practice of "doping," I write to place on record my personal experience with regard to it. These observations were made on horses either my own property, or which had for a long time been under my observation.

I. Abencerage, a seven-year-old thoroughbred, English, that had been attacked with pleuro-pneumonia on March 15. The temperature was 40·8, but on the 27th rose to 41·5°. On the 27th the horse was convalescent, temperature 38·2°. He fed well, but was most emaciated, and walked unsteadily, so much so that it was necessary to support him to prevent his falling. The horse being my property, I commenced a course of hypodermic injections of cacodylate in half-gramme doses, which on April 22 was increased to 1 gramme, and continued till April 27th without the animal showing any inconvenience. On this date he had the appearance of an animal in hard training, with a bright coat and his muscles well up, fresh, and in good spirits, and no trace of illness. He was only second in a race run that day on account of bad riding, but won one the next day, just three weeks after a serious illness, which usually entails a long period of convalescence.

II. La Gaite, a troop mare, Anglo-Arab, eight years old. Affected at the same time as the previous case, but not so severely. Treated in the same manner, was convalescent in fifteen days, and on April 27th won three prizes at a horse show.

III. Catalogue, thoroughbred; an officers' charger. The animal was in bad condition, and unable for work from the effects of a severe attack of infectious pneumonia two years ago. He was treated for six weeks on alternate weeks with the cacodylate, and recovered all the appearance of health. He was put to work, *i.e.*, training as a charger, but unfortunately broke down.

IV. Aeges, a thoroughbred mare, an officer's charger, after an attack of influenza, went wrong in her wind owing to consolidation of the lung, and in all probability some obscure lesion of the heart. The mare had never done any good on the turf, but after treatment with cacodylate she recovered her form, and won several times in second class company.

V. Amongst the troop horses are several convalescent cases from infectious pneumonia. Four of them have been treated with cacodylate, and four others without as controls. They have all had the same food,

and been treated in the same manner. There is an appreciable difference in their appearance, and I had intended weighing them, but unfortunately was prevented.

The owner of No. IV. wished to run her in better company, and having heard of the success of the American trainers with horses considered as useless, desired to have a trial made of the stimulants which he had heard spoken of, and after several trials the following was carried out, the cacodylate being continued.

For five days before the race, including the day of the race itself, 1 milligramme of arsenate of strychnine in granules was given morning and evening in a hollow carrot. On the day of the race the second dose was given an hour before, and half-an-hour before starting 1 gramme of cafeine and ½ gramme of sulphate of atropine in a hypodermic injection.

The symptoms were very slight; the mare was somewhat nervous, sweating slightly, and the face a little drawn, but nothing striking. The result was that three times she easily beat horses that at other times she would not have come near to, and the same happened with five other horses. After the race all that was to be seen was a little extra sweating.

The next day and day after none of the horses appeared much the worse. Perhaps they were a trifle more excitable for a few days, but the beats of the heart were normal, also the respiration. One had palpitations, which were relieved with a little digitaline, and did not recur.

It is certain that it is owing to these stimulants that these horses showed such improved form; also that overdoing, or too often repeating it, will ruin the constitution, and send a very inferior lot of stallions to the stud.

(*Revue Generale de Médécine Veterinaire*, 1st February 1904.)

NOTES ON MYIASIS.

BY CAPTAIN P. S. LELEAN, R.A.M.C., F.R.C.S.ENG.

THERE would seem to have been a somewhat strong prejudice against flies as remotely as the time of the fourth plague of Moses, 1491 B.C., and it is interesting to follow the development of that prejudice into the definite knowledge of the present day, when the researches of the entomologist and the pathologist have shown how important a part is played by winged insects in the etiology of human disease.

Since the geographical distribution of the larvæ which cause myiasis is almost co-existent with that of the order *Diptera*, extending as it does from the Shetlands to the Equator, the study is obviously not of merely tropical interest; nor can it be said to concern only the biologist, when it is observed that a series of thirty-eight cases, recently collected by Maillard, of *Compsomyia* larvæ showed a mortality of 55 per cent.

Referring to ancient records, we find that in 1582, Ambrose Paré described a maggot passed per urethram, which he calls "oniscus." This is the first of a series of thirty such recorded cases, the second being in 1641, and the last—published by Dr. Foster Palmer recently—being a larva of *Homalomyia scalaris* (house-fly).

A definite attempt was made by Baier in 1740 to place the subject on

a more scientific basis in an article entitled "De generatione insectorum in corpore humano."

In 1787, we read of a case of "Violent pains from worms under the skin," which worms were "near an inch long, all in joints in the back, with hard scales," and the theory of infection by insects is only tentatively advanced as a mere speculative explanation of a pathological novelty.

Clarke, in a brilliantly illustrated and able contribution to the Transactions of the Linnean Society in 1797, establishes the relation between larvæ and œstridæ, elucidates the confusion involving the classification of the latter, and incidentally combats some suggestive fallacies of his day: one *re* the ovulation of *Œstrus hæmorrhoidalis* suggested by the quotation, "Mire per anum intrans" showing the need for an illuminating contribution to the literature of his day.

In 1824 a really interesting case was reported from the sister isle. A lady, after a prolonged geophagism, became subject to constant vomiting, and produced quite a remarkable biological collection, in which, among many strange beasts, dipterous larvæ "literally teemed," larvæ, pupæ, and *imagines* being curiously ejected together. One realises the paucity of accurate knowledge in the last century when one reads that it inspired "a feeling of horror to see them (the larvæ) frisking along, occasionally expanding their jaws and extending their talons," and although the doctor himself witnessed the extrusion of these forms, it is impossible not to be a little sceptical of the patient's *bona fides*, when one reads that she invariably concluded by "chanting the Litany at full length in a clear and beautiful voice."

In 1842 an eminent London physician writes:—"I saw hundreds of worms escaping from the skin of her body; the carpet was covered with them where she stood while dressing . . . they had a power of ejecting themselves to a distance of from 12 inches to 20 inches"—a startling fact, but confirmed in 1899 by Lieutenant-Colonel J. Smith, who saw dipterous larvæ spring a distance of 3 feet.

Coquerel, writing in 1858, *Des Larves des Diptères développés dans les Sinus Frontaux*, makes thls lament:—"Ces faits sont peu précis et laissent beaucoup à désirer sous le raport scientifique"; and twenty years later Cobbold responds in his "Entozoa," giving a list of species of reputed dipterous parasites under no less than fifteen headings.

1880 brings the record by Biaudet of a case of spontaneous cure of *Homalomyia scalaris* by a surfeit of sorrel. The growing interest in myisias is shown by the reading of a paper on this subject before the International Congress of 1881 by Dr. Smith of Dublin. In this he gave a brief summary of the progress in the classification of parasitic diptera from the time of Humboldt, who describes the *Oestrus humanus*. Smith contended that there is no *Oestrus hominis* peculiar to man, that human larval parasites are all muscidæ, and quoted the extraction from Dr. Livingstone's leg of a muscid larva in Central Africa.

In 1882 two cases of migrating larvæ appeared, on spiculated segmented specimen, 13 mm. long, being removed from the back of the neck after a three months' journey from the right ankle, leaving an indurated track.

Of more recent years, perhaps the most curious biological contribution is that of Dr. Folker of Guatemala on the gusano worm. The ovulation of this mosquito-like fly was observed to be effected as follows: The proboscis is inserted in the skin; the long body is arched until the "tail'

(? ovipositor) is passed along it as along a director; then, erecting itself on its hind legs to a convenient angle, a full charge of ova is passed deeply into the cavity, a boil ensuing in three days.

From a pathological standpoint Colonel David Bruce's recent demonstration of the rôle of *Glossina palpalis* in sleeping sickness stands alone in importance.

While on service recently with the Anglo-French Boundary Commission in Northern Nigeria my attention was drawn to this subject by the occurrence of ecto-parasitic larvæ on natives near the Sokoto Arc (7.18 N., 13.29 E.). I secured two larvæ, and hatched the flies. On submitting these to Mr. Austen, the dipterologist of the British Museum, he identified them as specimens of *Auchmeromyia scalaris*, Fabr., and I am indebted to him for the scientific description of fly and puparium accompanying the figure. Of this accurately defined species no larva has previously been described as a human ecto-parasite. The larva is of the usual muscid type, twelve-segmented with hooked mouth-armature.

DESCRIPTION OF THE FLY.

Mr. Ernest E. Austen, of the Zoological Department, British Museum, has been good enough to supply the following brief description of the fly:—

Family, MUSCIDÆ.

Auchmeromyia luteola, Fabr.

Musca luteola, Fabricius. *Systema Anthatorum*, page 286 (1805).

♂, ♀. Length, 10½ mm. to 12 mm.; length of wing, 10⅔ mm.; width of head, 3½ mm. in ♂, 4 mm. in ♀.

A rather stoutly-built fly, orange buff in general colour, but with the distal half of the abdomen blackish.

Head, orange buff, with the eyes wide apart in both sexes; *thorax* somewhat darker than the base of the abdomen, with a faint greyish bloom, and marked with two indistinct blackish longitudinal stripes, which do not extend to the hind margin of the thorax; *abdomen* in the ♂ with the hind margin of the first segment very narrowly, the hind margin of the second segment more broadly, a more or less complete forwardly tapering medium strip, the whole of the third segment except the extreme base, and two large lateral blotches on the fourth segment, meeting, or nearly so, in the median line—blackish. In the ♀ the blackish area on the abdomen is greater, since it includes in addition the whole of the second segment, except a more or less narrow band in the base. A striking sexual difference is to be seen in the second adbominal segment, which in the ♀ is twice the length of the same segment in the ♂. *Legs* orange buff. *Wings* faintly brownish, but entirely devoid of blotches or other markings, so that the veins are plainly visible.

The chitinous pupa-case of this species is of the usual reddish-brown colour and barrel-like shape common to the Muscidæ; it measures about 11 mm. in length, by 4⅔ mm. in greatest width.

The two specimens *bred* at Maradi by Captain Lelean are both females, and exhibit a divergence from the normal type in that their abdomens are almost entirely orange buff in colour and show but little trace of the blackish apical half as described above. Two other specimens *caught* by Captain Lelean's boy at the same place are, however, perfectly normal,

so that I am inclined to think that the pallor of the bred specimens is probably due to immaturity.

TREATMENT.

To conclude with a few notes on treatment:

In gusano worm the natives (1) occlude the orifice of the cavity in which the larva is contained by a piece of stamp-paper, the air-breathing parasite, being thus asphyxiated, can be expressed; (2) cover the aperture with a tobacco-leaf, the nicotine poisoning the grub.

Dr. Folker uses a hypodermic of chloroform which so paralyses the larvæ that he has by this means expressed as many as fourteen in less than two minutes, a velocity which commands respect. The *Dermatobia noxialis* (screw worm) is killed in the frontal sinus by carbolic injections of a 2 per cent. solution.

In the auditory meatus the larvæ often cause so much tenderness as to make mechanical extraction impossible. A little calomel blown into the meatus is said to cause their death and spontaneous extrusion.

Lieutenant-Colonel J. Smith, writing of Indian experience, found maggots ingested in mangoes most difficult to dislodge, a fact not to be wondered at when they survived five minutes' immersion in pure carbolic acid. One patient passed from fifty to a hundred larvæ daily for twelve months, and intensely feared their eating through the intestine. One case was cured by enemata terebinthinæ; another was on butea frondosa, and in a third—parasiticides having no effect—scybalua were produced by opium, and the embedded maggots came away by subsequent use of purgatives and enemata.

Finally, in huts infested by diptera, if cones of dry pyrethrum powder be burnt the flies fall stupefied to the floor, whence they can be collected and burnt.

(*British Medical Journal*, 30th Jan. 1904.)

THE ACTION OF HUMAN SERUM ON THE TRYPANOSOMA OF NAGANA, MAL DE CADERAS, AND SURRA.

BY M. A. LAVERAN.

In a communication made on April 1st, 1902, to the Academy, M. Laveran called attention to the remarkable action human serum exercised on the trypanosoma of nagana, "*Tr. Brucei.*" He has now shown that the trypanosoma of mal de caderas and surra are equally affected. Human serum, even when collected with the greatest care and kept in ice, very quickly loses its properties, so the author has given up attempting to preserve it in a fluid state. The dry serum is as active as the fresh, and lasts good for a long time. Ten centigrammes of the powder correspond to 1 cubic centimetre of serum.

1. *Action of Human Serum on the Trypanosoma of Nagana.*—Half a centimetre of human serum injected subcutaneously into a mouse affected with nagana causes the disappearance of the trypanosoma in from twenty-four to thirty-six hours if the animal is not too deeply infected. In from four to five hours after the injection the parasites alter in form, and they rapidly decrease in number. They usually reappear in from eight to eighteen days after the injection, but some cases have been completely

cured, the parasite not returning, but such mice are susceptible to fresh inoculation, showing that they are not immune. In all cases successive inoculations with human serum has greatly prolonged the life of the animals.

2. *Action of Human Serum on the Trypanosoma of Mal de Caderas.*—In mice affected with mal de caderas the parasite disappears in from twenty-four to thirty-six hours after the injection of ½ to 1 centimetre of human serum, and the fewer the number of parasites there are in the blood when the injection is made the quicker they will vanish. If they are numerous the serum is often without effect. The trypanosoma usually reappear in from six to eight days, and another injection is necessary. Repeated injections greatly prolong life; mice suffering from mal de caderas that were not treated died in six to eight days, whereas those that were lived from sixty to one hundred and thirteen days after inoculation with the parasite.

In five to six hours after the serum is injected there is an appreciable diminution in the number of the parasites, but there is no marked leucocytosis, and the phagocytes only attack those parasites that are greatly altered.

3. *Action of Serum on the Trypanosoma of Surra.*—The action of the serum is the same as in nagana and mal de caderas. To recapitulate, human serum injected into animals suffering from nagana, surra, and mal de caderas causes the temporary, and in some cases permanent, disappearance of the parasite. The natural evolution of these diseases is always fatal in mice, and no other means of treatment have been successful, for although arsenic causes the trypanosoma to temporarily disappear, the relief is not permanent. It is worthy of remark that it is only human blood serum that possesses these properties; that of the other mammalia, even that of monkeys and apes, that nearly resemble human beings, does not. The trypanosoma of these three diseases will not develop in man, whereas others, such as those of Dutton's disease and sleeping sickness, do so, and when their action has been fully studied on the mammalia, the serum of refractory animals may be found to be of use in the treatment of them in man.

(*Comptes rendus Academié des Sciences*, 6th July 1903.)

A CONTRIBUTION TO THE STUDY OF LACTOSURIA AND THE UROLOGY OF PARTURIENT APOPLEXY.[1]

BY M. CHARLES PORCHER, PROFESSOR, LYONS VETERINARY SCHOOL.

GENTLEMEN—Since I had the honour of bringing to your notice last year the preliminary researches I had made into the subject of lactosuria (Charles Porcher and P. Leblanc, *Bulletin de la Société Central de Méd. Vét.*, 24th July 1902 and 13th November 1902), I have had reason to give the following advice. If sugar is present in the urine of a milking animal that is unwell, before thinking of anything else it is necessary to determine what sort of sugar it is. If it is lactose the case is trivial, if glucose the matter is serious. In making this statement, naturally I have parturient apoplexy, or, as it is sometimes termed, "milk fever," in my mind.

[1] Communicated to the Central Veterinary Medical Society, Paris, 23rd July 1903.

The urology of purturient apoplexy has been the subject of attention from numerous observers, the most interesting being by the late M. E. Nocard before this Society (*Bulletin de la Soc. Cent. de Méd. Vét.*, 1885, page 121), also those of M.M. Saint Cyr and Violet in the second edition of their work on Obstetrics, and Lucet (*Recueil de Méd. Vét.*, 1891, page 293, and 1892, page 79). M. Albrecht, of the Munich Veterinary School, has also lately published forty-one analyses of urine from twenty-four cases (*Woch für Thierkeilkunde Und. Viehzucht*, November 6th and 7th, February 17th and 24th, 1903).

The earlier observations were deficient on one point—viz., the difficulty in differentiating between lactose and glucose. In this M. Albrecht had a great advantage, as it is now easy to distinguish the two when they are both present, especially in blood and urine. In fact the whole crux of the matters I am about to bring to your notice hinges on the nature of the sugar in the urine of cows suffering from purturient apoplexy.

In my earlier researches I thought that lactose was always present in the urine, but this was not remarkable, as in all milking animals, when the udder is not drawn, the lactose is reabsorbed, a portion being eliminated in the urine, which can be detected by Fehling's test.

I also, however, noticed that there were sometimes large quantities of glucose, and singularly it was more frequent in certain types of the disease than others; but this I will have to speak about later on. But in every case, without exception, whether attacked a few hours or several days after parturition, sugar of some sort was present in the urine, and M. Nocard in six cases found it in all.

M. Albrecht has not been so fortunate; out of forty-one specimens he only found sugar in twelve—three times out of seven cases before Schmidt's treatment had been adopted, and nine times out of thirty-four after, but I have reason to believe that these experiments are not exact.

I attach but little importance to the quantity of urea present, as even under normal conditions it is subject to great fluctuations, and in a disease that makes its appearance so suddenly as purturient apoplexy this is likely to be increased.

M.M. Lumiere and Chevrotier have shown (*Arch. de Med. Exp. et d'anat. path.* 1903, page 418) how the proportion of urea, phosphates, and chlorides varies from day to day in considerable quantities in the dog. They have also shown that certain substances supposed to affect nutrition have little or no effect in this way, but that it takes place spontaneously in healthy animals, and I think M.M. Lumiere and Chevrotier's conclusions may be reasonably applied to bovines.

I have not invariably detected albumen, but it has frequently been present. M. Nocard noticed it four times in six cases, and M. Albrecht thirty-one out of forty-one, but it is difficult to account for. The question arises, is it present through a pathological process, or is it due to reabsorption of caseine formed in the mammæ. This last theory may be likened to the presence of lactose, which is reabsorbed and partly eliminated by the urine, and there is no reason why the same should not take place with caseine. This may explain why albumen sometimes appears in the urine during pregnancy, and a little before or after calving, without any patho logical cause.

My observations have been made on fifteen cases, which I will classify as follows:—

1. Where lactose only was present, nine cases.
2. Where, in addition to lactose, glucose was present—
   (*a.*) In considerable quantities, three cases.
   (*b.*) In small quantities, three cases.

I am indebted to M. Rey, of Ain, for a particularly interesting case. The cow calved without any trouble on October 29. On October 31 she became unwell, and at 11 P.M. was down in a comatose condition, the cornea insensible to the finger, respiration laboured and slightly quickened, suspension of urine, and constipation; temperature 36·2 Cent. On the evening of November 1 she was slightly improved, got rapidly better, and stood up; on the 2nd she was out of danger. The analysis of the urine in this typical case is most instructive.

On the evening of the 31st only lactose was present—6·20 grains. On the morning of November 1 an enormous increase of sugar—50 grains, a large quantity being glucose as well as lactose. In the evening it had almost disappeared, and on the morning of the 2nd was absent, having disappeared almost as quickly as it had arrived, and with it the symptoms of the attack, proving there was a relationship between the two.

It would appear reasonable to suppose that it was due to some rapid interference with the bulb, of short duration, like a prick of the floor of the fourth ventricle, but whether this is due to the action of a toxine or hæmorrhage I am not able to say; but it appears to me that there can be little doubt that the glycosuria is of bulbar origin, from some cause analogous to a prick of the floor of the fourth ventricle. Glycosuria is not always a symptom, but it must not be concluded that the case is not one of parturient apoplexy because it is absent, for if the bulb is not implicated there is none present. There thus will only be lactosuria, from the absorption of the lactose formed in the mammæ; and this is not, as a rule, very marked, although I have seen considerable quantities, in one case 25, and another 40 grammes. I have here a well crystallised specimen of this sugar, which I have obtained by Hofmeister's method (*Zeit. für Physiologische Chemie*, vol. i., page 101, 1877, 1888).

In conclusion, I must express my thanks to M.M. Carrey, Jacquot, Parent, Ray, and Rougemont, who have assisted me in making up these observations.

(*Bulletin de la Société Céntrale de Médecine Vétérinaire*, 30th September 1903.

TRYPANOSOMA OF THE CAMEL IN THE FRENCH SOUDAN.

BY M. CAZABBOU.

CAMELS in the French Soudan are subject to an enzootic, called by the Moors and Arabs in the neighbourhood of Timbuctoo, mbori or "fly-sickness."

The duration of the disease is variable, death taking place in from two to eight months or even earlier, with the symptoms of progressive anæmia, the appetite remaining, but the animal getting gradually thinner.

The disease commences in the months of January to March, when the flooded country on the banks of the Niger begins to dry up. A fly, which is known as the "el debab," and is very common in the neighbourhood, is

said to be the cause of the disease by the natives, but some of the camels raised on the bank of the river appear to enjoy immunity.

The blood contains a trypanosoma in large numbers, which appears to, at all events, resemble, if not identical with, the Tr. Brucei. The disease seen in camels in Timbuctoo may very likely be nagana or tsetse, and if so the fact is of great interest, as it is possible that through the medium of the caravans that cross the Sahara, and connect it with Morocco and Algeria, the disease may be introduced on to the Mediterranean littoral. Quite recently M. Szewezyck has reported from the Southern Soudan a disease that appears to be true nagana. Seven horses out of a detachment of Spahis have been attacked, and in all the trypanosoma were present in the blood. It is quite possible that it is nagana imported from Timbuctoo.

Nagana has been discovered on the west coast of Africa at Chari, annual epidemics having devastated that locality, and rendering it impossible to keep animals on the banks of the rivers during the rainy season; and there is reason to fear that it may extend over all the French possessions on the west coast to the sea, as it did in the German at Tove, and the Cameroons in 1901.

The study of the trypanosoma is one of the greatest importance. Ten years ago only one was known, East Indian "surra;" to-day the nagana of Africa, dourine of Algeria, mal de caderas of South America, galziekte of South Africa, are all known to belong to this class. Furthermore, several obscure diseases in the human being are due to the same cause. Dulton has proved it in the remittent fever of the Gambia and Congo, and Castellani and Bruce in the sleeping sickness of Equatorial Africa.

(*Bulletin de l'Academie de Médecine*, 30th June, page 807.)

To our Readers.

We beg to announce that with the January number a series of Original Articles is commenced, from the pen of Lieut.-Colonel Nunn, on "Veterinary Toxicology." It is expected to publish these articles in book form at the conclusion of the series.

VETERINARY TOXICOLOGY.

BY LIEUT.-COLONEL J. A. NUNN, F.R.C.V.S., F.R.S.E., C.I.E., D.S.O., BARRISTER-AT-LAW, DEPUTY DIRECTOR-GENERAL ARMY VETERINARY DEPARTMENT.

(*Continued from page* 109.)

If a positive result is obtained, the analysis is recommenced on each viscus separately, so as to act as a control on the first, and to localise the poison, a third or a quarter of the remains of the material being used for this purpose, the balance being reserved for control.

By this plan the material, before being analysed for a metal, can be used to test for other suspected poisons, such as hydrocyanic acid, carbonic acid, &c., and has the advantage of being economical, which is a matter of importance, as frequently happens that there is only a small quantity available.

I. *Metals and stable alkalies.*—Most of these substances are poisonous in small quantities, and before death are rapidly diffused

throughout the whole body, being scattered over a large mass of material. This adds considerably to the difficulty of detection. When deposited they often form an insoluble compound on which the characteristic tests are inert, and therefore it is necessary to destroy or get rid of the organic matter, at the same time taking care that none of the poison is lost. Incineration is not to be recommended, as most of the volatile poisons will be lost, either partly or totally, and the same takes place by the use of strong chemicals. There are many methods for carrying this out, but it is only necessary to mention a few of those most commonly in use.

A. *Fresenius and Babo's method, modified by Ogier.*—This consists in the destruction of the organic matter by the combined action of chlorine and hydrochloric acid. The suspected material is beaten up with water, till it becomes fluid, but is *not* to be diluted, an equal weight of chlorate of potash is added, and the whole placed into the flask A. Fig. 1.*

In the flask B.* commercially pure hydrochloric acid is placed, and into it pure sulphuric acid is slowly introduced by means of the funnel C. By this means hydrochloric acid gas is given off, which after passing through the wash bottles, DD, passes into the flask A, and destroys the organic material. A test tube, E, containing distilled water, receives any volatile material that may be driven off.

Organic material is destroyed very rapidly by this process, Ogier having reduced 1000 to 1500 grammes of viscera in half an hour. The residue is a clear yellow fluid, which after filtration is deprived of the excess of chlorine by passing through it a current of sulphurous acid, which is obtained by treating pure bisulphite of soda with sulphuric acid and adding it drop by drop to the product, the excess of sulphurous acid being given off, and the fluid filtered while hot.

B. *Flandin and Danger's Method modified, by Gautier and Chapuis.*—The drawback to the preceding method is that certain volatile substances may be formed and lost in the process, also that fatty matters are not destroyed. For this reason many chemists prefer Flandin and Danger's method, which consists in the destruction of the material by the successive actions of nitric and sulphuric acids.

The original method has been considerably modified with the object of completely oxidising the material without destroying the poison. Gautier, who has carefully studied the question, recommends the following plan :—100 grammes of the suspected material is cut up if necessary into small fragments and placed in a porcelain vessel of 600 cc. capacity, 30 grammes of pure nitric acid is added, and the whole slightly heated, the material gradually liquefying, becoming of a viscid consistency and turning an orange colour. The vessel is then removed from the flame, and 5 grammes of pure sulphuric acid added, and it is again

* These will be printed in next number.

heated until fumes of sulphuric acid are given off. From 10 to 12 grammes of nitric acid are then added drop by drop, causing the material to again liquefy, and give off nitrous fumes, and when all the acid has been added it is again heated to carbonisation. The resulting matter, which is easily pulverised, is washed out of the capsule with boiling water, the fluid, which is of a light brown colour, filtered, treated with a few drops of bisulphate of soda, and reserved for testing.

Chapuis has introduced several improvements. One hundred grammes of the suspected material in small pieces is mixed with 30 grammes of pure nitric acid in a vessel of a litre capacity, heated for 10 minutes and allowed to stand till the next day. It is then heated again over a sand-bath, care being taken at first not to overdo it, and this is continued till it carbonises. When the mass commences to adhere to the sides of the vessel, without, however, giving off white fumes, it is taken off the flame, allowed to cool, and 10 cc. of nitric acid added. A large amount of vapour is given off, when the vessel is again placed on the fire until the fumes disappear. A porous friable coal is then obtained without any arsenic being lost, which is treated with 300 cc. of sulphuric acid, diluted with water to $\frac{1}{16}$, brought up to boiling and filtered while hot. The residue is washed in a similar manner two or three times with the same boiling liquor, so that 100 cc. of fluid remains.

This plan is specially applicable when arsenic is to be tested for.

C. *Pouchet's Method.*—This consists in heating the suspected material up to nearly 350° Cent. with nitric and sulphuric acids and bisulphate of soda.

About 100 to 150 grammes of the suspected material is mixed in a porcelain vessel with a fourth of its weight of pure bisulphate of potash, and an equal quantity by weight of the total of fuming nitric acid, the whole slightly heated till the action ceases. An excess of pure concentrated sulphuric acid is added so as to completely dissolve the residue; it is again heated nearly to boiling, when the oxidation commenced by the nitric acid is completed.

This method has to be conducted with care, to prevent the vessel breaking. If the last portions of organic matter are slow in dissolving, the process can be quickened by allowing the mixture to cool, adding a little nitrate of potash and reheating. The resulting fluid is nearly colourless and solidifies when cooled. It can be dissolved by boiling water and the fluid reduced by evaporation to 900 cc.

D. *Wohler's Method.*—This plan has the advantage of being carried out at a low temperature and any loss by evaporation is impossible.

The suspected material is cut into small pieces if it is not already in a pulp, and mixed in a mortar with sand into a paste which is placed in a large flask, through which a current of

chlorine is passed until it is saturated, coagulated, and turned white. The flask is closed and allowed to stand for 24 hours when the fluid is filtered and the residue frequently washed with boiling water.

The chlorine treatment can be preceded by heating the mixture and adding gradually a concentrated solution of potash, so as to completely dissolve the organic matter. The resulting fluid is slightly acidulated by dilute sulphuric acid and a current of chlorine passed.

By whichever plan is adopted a yellow fluid is obtained which contains most of the metals, and which, if too acid, can be neutralised with ammonia heated to 60° Cent. and treated by a current of pure sulphuretted hydrogen. To carry out this, it is introduced into a flask with a ground glass stopper sufficiently large for only one-third to be filled, the gas being passed in through a pipe till the flask is filled, when it is corked up and well shaken, this operation being repeated two or three times when the flask is let stand for several hours in a warm place tightly corked up.

The residue is then placed on a filter washed with boiling water, treated with a small quantity of nitro-hydrochloric acid, and evaporated to dryness, after which a little more water is added till a solution is formed that can be tested for silver, mercury, copper, lead, arsenic, and "if Fresenius and Babo's method has been used," antimony.

The different metals give the following reactions:—

1. *Silver.*—A purple red precipitate with chromate of potash, a brick red with arsenate of soda, and a flaky white with alkaline chlorides.
2. *Mercury.*—A drop of the solution on a strip of copper will leave a white stain that becomes shiny when rubbed, but disappears when heated.
3. *Copper.*—A drop of the solution on a polished strip of steel, such as a knife blade, gives a bright red stain that turns blue with a drop of ammonia.
4. *Lead* gives a yellow precipitate with iodide of potassium, and a white with sulphate of soda. The latter is insoluble in acids, but soluble in acetate of ammonia.
5. *Arsenic and Antimony.*—The solution can be tested by Marsh's method, when it will give the characteristic patches and rings.

The mother fluid treated with hydrosulphate of ammonia gives a precipitate which can be tested for iron, manganese, and zinc; after filtration and treatment with nitro-hydrochloric acid the filtrate can be tested for alkaline metals and earths.

The remaining coal or cinder in some cases contains lead and antimony, which can be tested for as described.

II. *Corrosive Acids.*—The common ones met with in cases of poisoning are sulphuric, nitric, hydrochloric, and oxalic. To a great

extent their poisonous properties are due to the corrosive action they exert on the intestines; this is only possible when they are in a concentrated form.

Although the local lesions may be strong presumptive evidence of the agent used, the analysis for these acids is not easy, as a considerable portion may have been vomited, and that retained in the organism not only is rapidly more or less completely neutralised, but the newly formed combination is quickly eliminated.

Two different cases may come under notice; one in which there is an appreciable amount of free acid present, and in the other only the salts resulting from their neutralisation.

In the first the examination can usually be confined to the vomited matter and the walls of the upper parts of the digestive track, first ascertaining approximately the quantity of acid present with litmus paper, by which means in many cases it can be determined if this acidity is due to a mineral organic or acid salt, as for instance, methyl violet and Congo red are turned blue by the strong mineral acids. It must be remembered, however, that this test is not infallible, as the change in colour will not take place unless there is a certain amount of acid present (0·25 grammes of sulphuric acid to the litre). Acetate of peroxide of iron will not colour red with sulpho-cyanide of potassium.

There are several methods of isolating free acids.

1*st.* The dried material can be digested in a large excess of alcohol, cold if nitric acid is to be tested for, at 50° Cent. if any other, the resulting solution being submitted to the appropriate tests.

2*nd.* Roussin's method is founded on the solubility of quinine salts in alcohol. The material is diluted with distilled water filtered and neutralised with hydrate of quinine, again filtered, and evaporated to the consistency of syrup. To this is added alcohol, which dissolves out the sulphates and nitrates of quinine, and the residue is kept for analysis.

If hydrochloric acid is to be tested for, the watery extract is divided into two portions. From one the free acid is drawn off by evaporating it to dryness and the residue treated with water acidulated with nitric acid, the remaining hydrochloric acid being estimated with nitrate of silver.

The other portion is neutralised with liquor potassæ and precipitated with nitrate of silver, thereby indicating the amount of hydrochloric acid present. The amount of free hydrochloric acid is ascertained by subtracting the first result from the second.

In cases where there is no free acid, the analysis is exceedingly difficult; for although it is true that the presence of an appreciable quantity of the salts of these acids can be demonstrated, it must be remembered that certain of them normally exist, or they may have been taken mechanically into the system.

III. *Volatile Substances.*—Phosphorus, hydrocyanic acid, alcohol,

ether, and chloroform are the common agents of this nature that give rise to poisoning.

The suspected material is usually subjected to distillation, the suspected substance being looked for in the distillate. It is liquefied with water before distillation and acidulated with sulphuric or tartaric acids. The details will be described further on.

IV. *Alkaloids.*—Alkaloids are most difficult to detect, and the process and manipulations necessary are exceedingly troublesome and delicate. Most alkaloids are poisonous in very small doses and consequently have to be separated from a large quantity of organic matter, and by the putrifaction of this ptomaines are formed, that greatly complicate if not entirely obscure the analysis. Furthermore, care has to be taken to avoid using certain agents, which, acting as ferments, disintegrate organic matter, and in doing so produce new compounds that will entirely mask all tests.

If there is no indication of the suspected poison being an alkaloid, the case is even still more complicated as a general analysis has to be made.

Stas's method, which he discovered in 1852, and which has been slightly modified, is the best and the one most generally used. It is based, *1st*, on the solubility in water and alcohol of the acid salts of alkaloids; *2nd*, on the property of alkaloids set free by a base of remaining in either temporary or permanent solution in the fluid in which they are dissolved; *3rd*, the property possessed by ether of removing the free alkaloids from the solution.

The following is the process adopted by Stas. The suspected matters or organs are cut into small pieces and double their weight of pure absolute alcohol is added with half to two grammes of tartaric or oxalic acid. The mixture is then placed in a flask and heated over a water bath for half an hour at 75° Cent.; it is then let cool, the contents placed on a filter and washed with alcohol; the filtrate is evaporated at 35° Cent., by which means most of the alcohol is driven off.

The fatty matters are deposited in the resulting fluid. It is again passed through a filter previously moistened with distilled water, and the filtrate again carefully evaporated *in vacuo* or under a glass bell in the presence of sulphuric acid or quicklime.

The extract is again treated with absolute alcohol and again evaporated, the residue being dissolved with a very small quantity of water, and put into a test tube, a small quantity of pure powdered bicarbonate of soda being added till effervescence ceases. It is then shaken up with four or five times its volume of ether, and allowed to stand.

A portion of the ether is decanted into a watch-glass and evaporated; the residue being tested to detect if there is a volatile or fixed alkaloid.

A. *Liquid and Volatile Alkaloids.*—If on evaporation the ether leaves faint streaks of fluid on the sides of the watch-glass or dish

which run to the bottom when slightly warmed, and a disagreeable smell is given off either pungent, irritating, or suffocating as the case may be, it will indicate the presence of a volatile alkaloid.

To the contents of the test tube 1 or 2 cc. of a concentrated solution of potash are added, the mixture shaken up and allowed to stand, when the ether is decanted and shaken up with 1 or 2 cc. of sulphuric acid. The sulphates of almost all the alkaloids, being insoluble in ether, are found in the acidulated fluid. This, previously neutralised with soda, is treated with pure ether, which is slowly evaporated at a low temperature, leaving the alkaloid in almost a pure state.

Solid non-volatile alkaloids.—If after the ether is evaporated from the watch-glass a solid residue remains, or opaque fluid holding solids in suspension, without any pungent or disagreeable smell, and turns red litmus paper blue, the alkaloid is a solid one. The material should be neutralised with bicarbonate of soda treated with ether and again evaporated. In some cases it is advisable to first add a small quantity of concentrated solution of potash.

The extract contains the alkaloid which it is necessary to crystallise. This is done by adding a few drops of water undiluted with sulphuric acid, which will dissolve and separate it from any fatty matters that may be present. The solution is decanted slowly, evaporated, and reduced to three-fourths. A strong solution of pure carbonate of potash and alcohol is added, by which the alkaloid is dissolved, and from which it is recovered after evaporation in crystals.

Dragendorff has improved on Stas's original method by using several dissolvents (Petrol, benzine, and chloroform), instead of a single one, and preserves a considerable portion of the alkaloid, which previously was lost. Furthermore, as each dissolvent has a special affinity for certain substances, the testing for them after evaporation is easier than if the case of one only is available; also time is saved.

Dragendorff, after cutting up the suspected material into small pieces, adds water until a clear solution is formed, to which is added 5 per cent. sulphuric acid. The mixture is put into a flask heated over a water bath for several hours at 50° per Cent., and filtered. The residue is treated a second time in the same manner, the two solutions added together, and evaporated over a water bath to the consistency of a syrup.

To this is added four or five times its volume of alcohol at 95° proof, in order to precipitate the mineral salts, and it is allowed to stand for 24 hours, then filtered. The filtrate is distilled to get rid of the alcohol, and the residue brought up to 50 cc. with water. It is then treated with petrol, benzine, and chloroform.

This operation is carried out by placing the fluid in a flask or test tube, to which, first of all, about 20 to 25 cc. of petrol is added the whole shaken up and decanted. This process being repeated

several times, the benzine and chloroform are used in a similar manner.

The fluid, after all traces of chloroform have been got rid of by a current of air, is neutralised with excess of ammonia, and again treated with the dissolvents. By this plan a series of solutions are obtained, which, after filtration, are evaporated, and leave residues which can be tested for the various alkaloids which will be found in one or other.

Legal News.

By Guy H. Guillum Scott, Barrister-at-Law.

In the High Court of Justice, King's Bench Division.

(Before Mr. Justice Walton and a Common Jury.)

GIBSON *v.* ROSS.

This was an action brought by Dr. J. H. Gibson, of 54 St. John's Wood Road, against Dr. Alexander Ross, of 56 Maida Vale, to recover £150 and interest upon a promisory note, of which the defendant was the maker.

Mr. Dickens, K.C., and Mr. J. D. A. Johnston appeared for the plaintiff; Mr. Bray, K.C., and Mr. A. Neilson for the defendant.

The defendant admitted the making of the promissory note, but said that it formed part of the purchase-price of the plaintiff's practice of 56 Maida Vale, and that the plaintiff fraudulently stated—(1) that the practice had at one time been worth £2500 per annum, but had diminished owing to the long continued ill-health of the plaintiff; (2) that the average receipts for the last three years prior to July 1902, were £429; and (3) that the practice was then of the value of £350 per annum. The plaintiff denied that he represented that the practice had been worth £2500 per annum, or any such sum. He said that in fact the average receipts from the practice for the last three years were £429 as stated, and that the practice was of the value of at least £350 per annum. He admitted that he told the defendant that the practice had diminished owing to his ill-health, the defendant's case upon this point being that it was due to habits of intemperance upon the part of the plaintiff.

Mr. Justice Walton, in summing up to the jury, said that the practice was taken over in September 1902. In March 1903, Dr. Ross made his complaint, and unfortunately the parties now found themselves in Court. Dr. Ross had said that the statement he complained of was that the practice was of the value of £350 a year. Dr. Ross admitted that before he completed the purchase he was told that the plaintiff had unfortunate habits. Dr. Ross really made his claim upon the ground of fraud, and further, upon a warranty by Dr. Gibson that the figures he had put before Dr. Ross were accurate. No doubt the practice had at one time been much larger. Figures were put before Dr. Ross, and no doubt if they were dishonest Dr. Ross would have a cause of action. Dr. Ross had done his best, and there was nothing to be said against him. Dr. Gibson was not in good health, and that was the reason why he was going away. Dr. Gibson very properly told Dr. Ross about the patients, and saying

who had better be called on and who would send for him when they required him. Dr. Ross was not to be blamed because he was moderate in his charges. The figures given by the plaintiff were the figures in the books, and there was no suggestion that they had been tampered with. It was said that they included about £150 club payments, which ought to have been omitted. But Dr. Gibson was telling Dr. Ross what he had been doing. It was a question for the jury whether they thought these figures could fairly be included in the accounts of the practice. The first question was, Did Dr. Gibson tell lies in order to induce Dr. Ross to buy the practice?

In answer to questions put by his Lordship, the jury found—(1) that there was no fraud on the part of Dr. Gibson; (2) that there was no warranty by him that the figures for the three years' receipts placed before the defendant were correct; (3) that those figures were in fact correct.

Mr. JUSTICE WALTON thereupon gave judgment for the plaintiff, with interest at the rate of 4 per cent.

(From *The Times*.)

Reviews.

"POINTS OF THE HORSE." By Captain M. H. HAYES, F.R.C.V.S., 3rd edition. Hurst & Blackett, London.

We are fain to confess that this, one of the most important subjects in the education of veterinary surgeons, is but feebly taught.

No man can be a good judge of the soundness of a horse, and the suitability of a horse for specific work, unless he have a thorough knowledge of correct conformation. To those who wish to gain this essential knowledge we advise a careful perusal of Captain Hayes' work.

It is almost superfluous to say that Captain Hayes is undoubtedly the best horseman, as well as the best informed man in horses, we have, either at home or abroad.

We have often felt some humiliation at horse shows, when we have seen what to us were the best horses in their classes relegated to a low place in the list, and have had a feeling that we and the judges must look at horses with very different eyes, or else that we don't know a good horse when we see one; but on reflection and comparison of our own knowledge with that of some judges we have not altered our opinion in respect to the good qualities of the horses which did not get ribbons.

Frequent perusals of the various editions of *Points of the Horse* have taught us much, and we cannot but admire the most careful way in which the author proves his statements.

Did space permit, we should have liked to have quoted some portion of this work—particularly from chapter VIII. on *Mechanism of Equine Locomotion*, and Chapter IX., on *Mechanism of Draught*. Again, the chapters on the horses of the different countries of the world is most fascinating reading to the lover of the horse. To our readers we most strongly recommend a careful perusal of this work. There is no member of our profession who cannot but be benefited by it, but should also improve his position and reputation as a "sound judge of a good horse," as well as that of being a "good judge of a sound horse," which he is supposed to have in his professional capacity.

Messrs. Hurst & Blackett are worthy of much praise for the excellent way in every respect in which the work is produced.

THE VETERINARY SERVICE OF THE FRENCH CONTINGENT IN THE ALLIED ARMY—CHINA EXPEDITION, 1900-1901. By M. BARASCUD, Principal Veterinary Surgeon China Expeditionary Corps. 1 vol. Price 5 francs. Published by Lafolye Freres, Printers, Morbihan, France.

The book is profusely illustrated, and M. Barascud not only gives his impressions of the voyage out, but gives details of the veterinary service in the China expedition, including the march to Pekin in which he took part. He describes the special measures taken against glanders and rinderpest, and in the course of his duties he had to visit the line of communication between Tong Kou and Pekin, Pekin and Tcheng Ting Fou, and Pao Ting Fou, and Tien Tsin.

Some valuable suggestions and remarks are made on the transport of animals, hygiene of ships, and diseases caused by excessive heat and insufficient air.

Chapters are devoted to the various animals used for transport and other purposes—a miscellaneous collection that almost reminds one of the Noah's ark of our childhood, and the organisation of the veterinary departments in the other armies that took part in the expedition—viz., English, German, American, Japanese, Russian, and Austrian, which is the most valuable portion of the book.

Notes and News.

AT a recent meeting of the Zoological Society of London, Mr. Macleod Yearsley, exhibited and made remarks upon an aneurism of the abdominal aorta from a jaguar, and photographs of one from a turtle. At the same meeting Dr. Walter Kidd proposed the use of two additional characters which he considered to be of some importance in the description of genera and species of certain mammals. These were the arrangement of the hair on the naso-frontal region and the distribution of hair-whorls.

Communications, Books, Journals, &c., Received.

Agricultural Journal (Cape of Good Hope); Berliner Thierärztliche Wochenschrift; La Clinica Veterinaria (Milan); Deutsche Thierärztliche Wochenschrift; Tannoform in Veterinary Medicine (March); The Sanitary Journal; Scottish Medical and Surgical Journal; Veterinary Record; La Riforma Veterinaria; Le Mois Scientifique (Paris); L'Echo Vétérinaire (Liège); Annales de Médecine Vétérinaire (Brussels); Johns Hopkins Hospital Reports; Journal of Comparative Medicine and Veterinary Archives; Recueil de Médecine Vétérinaire; Gazette Médicale de Paris; Modern Medicine; Johns Hopkins Hospital Bulletin; Il Veterinario di Campagna (Moncalieri); Le Bulletin Vétérinaire (Orleans); Revista de Medicina Veterinaria (Bucarist); La Revista Veterinaria (Buenos Aires); Zeitschrift für Fleisch und Milchhygiene (Berlin); Buletinul Societatii de Sciinte diu Bucuresci-Romania; The Meat Trades Journal; The Dental Record.